[H.A.S.C. No. 101-8]

HEARINGS

ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1990—H.R. 2461

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED FIRST CONGRESS
FIRST SESSION

PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE HEARINGS
ON

PROCUREMENT OF AIRCRAFT, MISSILES, WEAPONS AND TRACKED COMBAT VEHICLES, AMMUNITION, AND OTHER PROCUREMENT

HEARINGS HELD
MARCH 8, 16, 23, MAY 11, 18, AND 23, 1989

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I

101st CONGRESS
1st Session

H. R. 2461

To authorize appropriations for fiscal years 1990 and 1991 for military functions of the Department of Defense and to prescribe military personnel levels for such Department for fiscal years 1990 and 1991, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

May 24, 1989

Mr. Aspin (for himself and Mr. Dickinson) (both by request) introduced the following bill; which was referred to the Committee on Armed Services

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A BILL

To authorize appropriations for fiscal years 1990 and 1991 for military functions of the Department of Defense and to prescribe military personnel levels for such Department for fiscal years 1990 and 1991, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Department of Defense Authorization Act, 1990/1991".

(V)

TITLE I—PROCUREMENT

SEC. 101. ARMY.

(a) FISCAL YEAR 1990.—Funds are hereby authorized to be appropriated for fiscal year 1990 for procurement for the Army as follows:

(1) For aircraft, $2,906,100,000.

(2) For missiles, $2,566,700,000.

(3) For weapons and tracked combat vehicles, $2,724,000,000.

(4) For ammunition, $1,704,800,000.

(5) For other procurement, $3,192,900,000.

(b) FISCAL YEAR 1991.—Funds are hereby authorized to be appropriated for fiscal year 1991 for procurement for the Army as follows:

(1) For aircraft, $3,038,200,000.

(2) For missiles, $2,803,900,000.

(3) For weapons and tracked combat vehicles, $2,781,600,000.

(4) For ammunition, $1,574,000,000.

(5) For other procurement, $3,857,200,000.

(c) FISCAL YEAR 1992.—Funds are hereby authorized to be appropriated for fiscal year 1992 for procurement for the Army as follows:

(1) For aircraft, $270,500,000.

(2) For missiles, $950,100,000.

(3) For weapons and tracked combat vehicles, $2,478,200,000.

(4) For other procurement, $739,500,000.

(d) FISCAL YEAR 1993.—Funds are hereby authorized to be appropriated for fiscal year 1993 for procurement for the Army as follows:

(1) For aircraft, $399,300,000.

(2) For missiles, $317,800,000.

(3) For weapons and tracked combat vehicles, $2,423,100,000.

(4) For other procurement, $876,700,000.

(e) FISCAL YEAR 1994.—Funds are hereby authorized to be appropriated for fiscal year 1994 for procurement for the Army as follows:

(1) For aircraft, $421,400,000.

(2) For missiles, $74,400,000.

(3) For weapons and tracked combat vehicles, $2,084,100,000.

(4) For other procurement, $999,200,000.

SEC. 102. NAVY AND MARINE CORPS.

(a) FISCAL YEAR 1990, NAVY.—Funds are hereby authorized to be appropriated for fiscal year 1990 for the Navy as follows:

(1) For aircraft, $8,673,000,000.

(2) For weapons (including missiles and torpedoes), $3,910,400,000.

(3) For shipbuilding and conversion, $9,550,600,000.

(4) For other procurement, $4,915,000,000.

(b) FISCAL YEAR 1990, MARINE CORPS.—Funds are hereby authorized to be appropriated for fiscal year 1990 for procurement for the Marine Corps in the amount of $1,196,800,000.

(c) FISCAL YEAR 1991, NAVY.—Funds are hereby authorized to be appropriated for fiscal year 1991 for the Navy as follows:

(1) For aircraft, $9,086,300,000.

(2) For weapons (including missiles and torpedoes), $4,465,200,000.

(3) For shipbuilding and conversion, $11,021,500,000.

(4) For other procurement, $5,697,200,000.

(d) FISCAL YEAR 1991, MARINE CORPS.—Funds are hereby authorized to be appropriated for fiscal year 1991 for procurement for the Marine Corps in the amount of $1,398,000,000.

(e) FISCAL YEAR 1992, NAVY.—Funds are hereby authorized to be appropriated for fiscal year 1992 only for multiyear procurement for the Navy as follows:

(1) For aircraft, $2,852,500,000.

(2) For weapons (including missiles and torpedoes), $345,900,000.

(3) For shipbuilding and conversion, $3,723,300,000.

(f) FISCAL YEAR 1992, MARINE CORPS.—Funds are hereby authorized to be appropriated for fiscal year 1992 only for multiyear procurement for the Marine Corps in the amount of $29,200,000.

(g) FISCAL YEAR 1993, NAVY.—Funds are hereby authorized to be appropriated for fiscal year 1993 only for multiyear procurement for the Navy as follows:

(1) For aircraft, $2,947,500,000.

(2) For weapons (including missiles and torpedoes), $558,500,000.

(3) For shipbuilding and conversion, $3,743,000,000.

(h) FISCAL YEAR 1994, NAVY.—Funds are hereby authorized to be appropriated for fiscal year 1994 only for multiyear procurement for the Navy as follows:

(1) For aircraft, $2,544,100,000.

(2) For weapons (including missiles and torpedoes), $980,300,000.

(3) For shipbuilding and conversion, $3,019,200,000.

SEC. 103. AIR FORCE.

(a) FISCAL YEAR 1990.—Funds are hereby authorized to be appropriated for fiscal year 1990 for the Air Force as follows:

(1) For aircraft, $16,787,200,000.

(2) For missiles, $7,382,200,000.

(3) For other procurement, $8,561,800,000.

(b) FISCAL YEAR 1991.—Funds are hereby authorized to be appropriated for fiscal year 1991 for the Air Force as follows:

(1) For aircraft, $18,243,800,000.

(2) For missiles, $10,087,600,000.

(3) For other procurement, $9,096,200,000.

(c) FISCAL YEAR 1992.—Funds are hereby authorized to be appropriated for fiscal year 1992 only for multiyear procurement for the Air Force as follows:

(1) For aircraft, $7,508,500,000.

(2) For missiles, $1,092,500,000.

(3) For other procurement, $234,000,000.

(d) FISCAL YEAR 1993.—Funds are hereby authorized to be appropriated for fiscal year 1993 only for multiyear procurement for the Air Force as follows:

(1) For aircraft, $11,738,700,000.

(2) For missiles, $559,300,000.

(3) For other procurement, $229,700,000.

(e) FISCAL YEAR 1994.—Funds are hereby authorized to be appropriated for fiscal year 1994 only for multiyear procurement for the Air Force as follows:

(1) For aircraft, $10,097,300,000.

(2) For missiles, $814,700,000.

SEC. 104. DEFENSE AGENCIES.

(a) FISCAL YEAR 1990.—Funds are hereby authorized to be appropriated for procurement for fiscal year 1990 for the Defense Agencies in the amount of $1,321,800,000.

(b) FISCAL YEAR 1991.—Funds are hereby authorized to be appropriated for procurement for fiscal year 1991 for the Defense Agencies in the amount of $1,429,700,000.

SEC. 105. DEFENSE INSPECTOR GENERAL.

(a) FISCAL YEAR 1990.—Funds are hereby authorized to be appropriated for procurement for fiscal year 1990 for the Defense Inspector General in the amount of $1,051,000.

(b) FISCAL YEAR 1991.—Funds are hereby authorized to be appropriated for procurement for fiscal year 1991 for the Defense Inspector General in the amount of $1,041,000.

SEC. 106. CHEMICAL DEMILITARIZATION PROGRAM.

(a) FISCAL YEAR 1990.—Funds are hereby authorized to be appropriated for fiscal year 1990 for the destruction of lethal chemical weapons in accordance with section 1412 of the Department of Defense Authorization Act, 1986 (Public Law 99-145; 99 Stat. 747) in the amount of $311,400,000.

(b) FISCAL YEAR 1991.—Funds are hereby authorized to be appropriated for fiscal year 1991 for the destruction of lethal chemical weapons in accordance with section 1412 of the Department of Defense Authorization Act, 1986 (Public Law 99-145; 99 Stat. 747) in the amount of $317,700,000.

SEC. 107. EXTENSION OF AUTHORITY PROVIDED THE SECRETARY OF DEFENSE IN CONNECTION WITH THE NATO AIRBORNE WARNING AND CONTROL SYSTEM (AWACS) PROGRAM.

Effective on October 1, 1989, section 103(a) of the Department of Defense Authorization Act, 1982 (Public Law 97-86; 95 Stat. 1100) is amended—

(1) by striking out "fiscal years 1988 and 1989" both places it appears and inserting in lieu thereof "fiscal years 1990 and 1991"; and

(2) by inserting after "December 6, 1978," the following: "the Memorandum of Understanding for Operations and Support of the NATO Airborne Early Warning and Control Force, signed by the United States Ambassador to NATO, and other follow-on support agreements for the NATO E-3A between the United States Government and the commander of the NATO E-3A Force,".

WEAPON SYSTEMS TESTING AND PRODUCTION DECISIONMAKING

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Wednesday, March 8, 1989.

The subcommittee met, pursuant to call, at 10:05 a.m., in Room 2118, Rayburn House Office Building, Hon. Les Aspin [chairman of the subcommittee] presiding.

OPENING STATEMENT OF HON. LES ASPIN, A REPRESENTATIVE FROM WISCONSIN, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

The **Chairman**. The meeting will come to order.

The purpose of the hearing this morning is to determine the linkage between weapons testing and production decision-making. Examples of inadequate testing before major procurement commitments are made; reliance on significant degrees of risk with highly concurrent programs; and disregard for missed testing milestones are cited as failures of the defense acquisition process. The subcommittee, therefore, is interested in determining why such problems occur and what actions have been taken to correct them.

Are the problems the results of organizational deficiencies, budgetary shortfalls or the lack of discipline in the system or a combination thereof? Hopefully, our witnesses this morning will be able to shed some light on these issues.

We are pleased to have with us Dr. Robert C. Duncan, the Director of Defense Research and Engineering; John Krings, Director of the Office of Operational Test and Evaluation. They are accompanied by Charles E. Adolph, the Deputy Director for Test and Evaluation; James F. O'Bryon, Director for Live Fire Testing and acquisition representatives of the military departments.

Gentlemen, welcome to the committee this morning, and I look forward to your testimony.

Dr. Duncan, you begin.

STATEMENT OF ROBERT C. DUNCAN, DIRECTOR, DEFENSE RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE; ACCOMPANIED BY LT. GEN. RONALD YATES, DIRECTOR, TACTICAL PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE; RICHARD RUMPF, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE NAVY, RESEARCH, ENGINEERING AND SYSTEMS; BRIG. GEN. WILLIAM CHEN, ASSISTANT TO DEPUTY ASSISTANT SECRETARY OF THE ARMY, SYSTEMS MANAGEMENT; BRIG. GEN. OTTO GUENTHER, PROGRAM EXECUTIVE OFFICER FOR COMMUNICATION, DEPARTMENT OF THE ARMY; CARROLL JONES, DIRECTOR, TEST AND EVALUATION FOR ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION), AND WALTER HOLLIS, DEPUTY UNDER SECRETARY OF THE ARMY (OPERATION RESEARCH)

Dr. DUNCAN. Thank you, Mr. Chairman, and members of the committee. We appreciate the opportunity to appear before you today to discuss the role of test and evaluation in the acquisition decisionmaking process.

In preparation for today's hearing, the committee proposed five questions dealing with various aspects of acquisition decisionmaking.

At this time, I would like to describe the Defense Acquisition Board process (DAB), and the criteria used to reach full-scale development and production decisions.

Following my statement, Mr. Adolph, the Honorable Jack Krings, and Mr. O'Bryon will each have statements to make and then we will be prepared to answer questions.

We have as backup witnesses, representatives of the various services that I'd like to introduce if I could. One is Mr. Dick Rumpf, the Principal Deputy Assistant Secretary of the Navy; Gen. Ronald Yates, the Principal Deputy Assistant Secretary for Acquisition of the Air Force; Gen. William Chen of the Army, and Gen. Otto Guenther of the Army, as we talk about, and if we talk about specific programs as they relate to testing and as they relate to the acquisition process.

The formal Defense Acquisition Board review is preceded by a thorough examination of the acquisition program by the service and by the OSD staff. The DAB structure is supported by an acquisition committee structure. Ten separate committees are established in such areas as: Conventional Systems, Strategic Systems, C^3I Systems, Science and Technology, Test and Evaluation, and so forth.

The appropriate committee conducts a thorough review of the acquisition program, usually weeks prior to the DAB. This review involves detailed presentations by the service user representatives, by the Service Program Manager, by the responsible test activities, by the independent cost estimators, and others as required.

The Milestone II review to approve entry into full-scale development (FSD) occurs prior to the award of the FSD contract. For this review, the primary items considered in the DAB structure deliberations are:

program risk;

planning for the transition from development to production;

industry surge and mobilization capacity;
factors affecting program stability;
potential common-use solutions;
results from prototyping and demonstration/validation;
milestone authorization;
manpower, personnel, training and safety assessments;
procurement strategy;
plans for integrated logistics support;
affordability and life-cycle costs,
and command, control, communications and intelligence requirements.

The Milestone II DAB process reviews the planning for assets to conduct testing needed for interoperability, Live Fire, or operational testing and may approve, as appropriate, long lead production of components needed in preparation for low-rate initial production.

The formal DAB review itself is structured to focus upon the unresolved items highlighted by the committee review. The chairman of the appropriate committee provides a brief discussion of the review conducted by his committee. He specifically raises the unresolved items of importance.

Normally, at the DAB, the program manager from the developing agency will provide a brief presentation of his plans to address each of the highlighted issues. The remainder of the DAB review allows the DAB members the opportunity to discuss these issues and other concerns they may have. The decisions of the DAB are incorporated into a formal Acquisition Decision Memorandum, which we call the ADM.

The DAB review provides the forum in which test concerns, along with other key factors, can be addressed.

At each DAB milestone, the Director of Development Test and Evaluation, Mr. Adolph; the Director of Operational Test and Evaluation, Mr. Krings, provide a test and evaluation assessment of Government and contractor results.

We require that the Test and Evaluation Master Plan (TEMP) be updated and available for OSD review and approval.

The acquisition committee review provides the forum in which all test concerns, including Live Fire Test, which we consider to be a subset of development testing, can be addressed.

Test and evaluation provides a valuable input to the weapon system decision process by providing an assessment of the program at each decision milestone beginning with the program initiation through full-rate production.

Mr. Chairman, I have a statement that I'd like to enter into the record, and I'd like to call attention to Table 1 in that statement, which is right at the end of the statement. This provides definition of the five key milestones and the purpose of test and evaluation at each of those milestones.

Defense system test and evaluation is conducted on weapon system components as soon as possible and supported throughout the program by analytical techniques. The earlier initial prototypes or actual hardware and software components can be tested, the better. However, hardware and software are not always available, particularly in the early phase of a program, and at this phase when developers need valuable feedback on their early designs.

Further, when hardware or software does become available for testing, practical limitations such as range capability and safety prevent full replication of the anticipated combat environment.

For these reasons, DOD is forced to place increasing reliance upon a range of testing techniques that combine the most valued aspects of computer simulation, modeling and analytical techniques, along with actual system testing.

In closing my statement, I believe that the test and evaluation function is provided ample opportunity to support the objectives of defense acquisition.

We appreciate the interest that the Congress and this committee continues to express with regard to test and evaluation and look forward to working with you on ways to continuously improve this critically important function.

The Honorable John Krings, the Director of Operational Test and Evaluation, has a statement to make at this time.

PREPARED STATEMENT OF DR. ROBERT C. DUNCAN, DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

Mr. Chairman and Members of the Committee:

I am Robert Duncan, the Director of Defense Research and Engineering. We appreciate the opportunity to appear before you today to discuss the role of test and evaluation in acquisition decision-making.

In preparation for today's hearing, the committee proposed five questions dealing with various aspects of acquisition decision making. At this time, I would like to describe the DAB process and the criteria used in reaching Full-Scale Development (FSD) and production decisions. Following my statement, Mr. Adolph, the Deputy Director of Defense Research and Engineering for Test and Evaluation, and Mr. Krings, The Director, Operational Test and Evaluation will address the remaining questions.

The formal Defense Acquisition Board (DAB) review is preceded by a thorough examination of the acquisition program by the Service and by the OSD staff. The DAB structure is supported by an Acquisition Committee structure. Ten separate committees are established in such areas as: Conventional Systems, Strategic Systems, C^3I Systems, Science and Technology, Test and Evaluation, etc. The appropriate committee conducts a thorough, detailed review of the acquisition program, usually several days to a few weeks prior to the DAB. This review involves detailed presentations by the Service user representatives, by the Service Program Manager, by the responsible test activities, by the independent cost estimators, and others as required.

The Milestone II review to approve entry into full-scale development (FSD) occurs prior to the award of the FSD contract. For this review, the primary items considered in the DAB structure deliberations are:

* affordability in terms of program cost versus the military value of the new or improved system
* program risk
* planning for the transition from development to production
* industry surge and mobilization capacity
* factors affecting program stability
* potential common-use solutions
* results from prototyping and demonstration/validation
* milestone authorization
* manpower, personnel, training and safety assessments
* procurement strategy
* plans for integrated logistics support
* affordability and life-cycle costs
* and associated command, control, communications and intelligence requirements

Also, the Milestone II DAB process reviews the planning for assets to conduct testing needed for interoperability, Live Fire, or operational testing and may approve, as appropriate, long lead production of selected components needed in preparation for subsequent low-rate initial production.

The DAB Acquisition Committee review addresses the overall program status, resolves any minor concerns, and highlights the major issues that must, in turn, be addressed at the formal DAB.

The formal DAB review is structured to focus upon the unresolved items of substantial program impact highlighted by the Committee review. The Chairman of the appropriate DAB Committee provides a brief discussion of the review conducted by his committee. He specifically raises the unresolved items of principal importance. These may involve system performance, cost, schedule, test, or other considerations. Normally, the Program Manager from the developing agency will provide a brief presentation of his plans to address each of the highlighted issues. The remainder of the DAB review allows the DAB members the opportunity to discuss these issues, and other concerns they may determine of importance, and to reach judgments on how to proceed. The decisions of the DAB are incorporated into a formal Acquisition Decision Memorandum.

The DAB review provides the forum in which test concerns, along with other key factors, can be addressed. (Mr. Krings, the independent Director of Operational Test and Evaluation, is a member of the DAB).

At each DAB milestone, the DDDRE(T&E) and the DOT&E provide a test and evaluation assessment of government and contractor test activity results. We look at the technologies involved and the testing that demonstrates the readiness of those technologies for military application and its readiness for development and production. We require that the Test and Evaluation Master

Plan be updated and available for OSD review and approval sufficiently before the scheduled Defense Acquisition Board meeting so that we will have the time needed to thoroughly review the planned scope of DT&E and the resources allocated.

The Acquisition Committee review provides the forum in which all test concerns, to include Live Fire Test concerns, along with other key factors, can be addressed. For example, should Live Fire Test and Evaluation concerns not be adequately resolved at the Committee level, then those unresolved issues would be highlighted for the formal DAB review either by the appropriate Committee chairman or the Director, Defense Research & Engineering.

Meanwhile, we cannot lose sight of the important and continuous role of T&E in the acquisition process. Specifically, T&E continuously interacts and contributes to multiple program functions including engineering design, design verification (contracts specification), production verification and assurance of combat effectiveness and operational suitability.

Thus, T&E also provides a valuable input to the weapon system decision process by providing an assessment of the program at each decision milestone beginning with program initiation through full rate production. Table 1 provides definitions of the five key milestones and the corresponding purpose of T&E. Each T&E input focuses on the results of testing in the previous phase and provides meaningful assessments to enhance the basis for deciding to proceed into the next phase.

T & E IN THE DECISION PROCESS

MILESTONE	INITIATES	T & E.
0	Concept Development	Conducts analysis and simulations to support selection of concept(s) for advanced development
I	Demonstration/ Validation	Tests prototypes combined with refined analysis to determine technical and operational feasibility of early designs
II	Full Scale Development	Tests pre-production design hardware/software to ascertain maturity for limited production and suitability for military use
IIIA	Low Rate Initial Production (LRIP)	Conducts technical and operational tests on LRIP units to ensure that systems with unacceptable flaws are not advanced into full rate production
IIIB	Full Rate Production	Provides results of operational testing to assure combat effectiveness and suitability as well as Live Fire Testing to assure system lethality and/or vulnerability

Table 1

Defense system T&E is conducted on weapon system components as soon as possible and supported throughout the program by analytical techniques. The earlier initial prototypes or actual hardware and software components can be tested, the better. However, hardware and software are not always available, particularly in the early phase of a program when developers need valuable feedback on their conceptual solutions and early designs. Further, when hardware/software does become available for testing, practical limitations such as range capability and safety prevent full replication of the anticipated combat environment which affects just how realistic a test can be. For these reasons, DoD is forced to place increasing reliance upon a range of testing techniques that combine the most valued aspects of computer simulation, modeling and analytical techniques, along with actual system component and operational testing.

Equally important to the acquisition process is the management of T&E. As you are aware, there are two principal offices in OSD who have responsibility for the management and oversight of Defense T&E. One is within the Office, the Under Secretary of Defense (Acquisition), the Deputy Director Defense Research and Engineering (T&E). The other is the Director, Operational Test and Evaluation (DOT&E).

Each of these organizations bring a different perspective to the acquisition process. The USD(A) must, by charter, balance all program elements including T&E; the DDDRE(T&E) must assess the quality of our weapons from a technical perspective to include live fire test objectives, and the DOT&E must make sure that the OT process is working well and providing the necessary input to make T&E a vibrant and effective element of the acquisition process.

The DAB's T&E committee answers a coordinated DoD wide approach to T&E, policy and resource management. It is chaired by DOT&E with DDDR&E/T&E serving as vice chairman. Its membership includes senior representatives from the Services, selected OSD offices and Defense Agencies.

In closing, the T&E function is provided ample opportunity to support the objectives of defense acquisition. Accordingly, we appreciate the interest Congress continues to express with regard to T&E and look forward to working with you on ways to continuously improve this critically important function of the acquisition process.

The CHAIRMAN. Thank you, Mr. Duncan.

Mr. Krings, the floor is yours.

STATEMENT OF JOHN E. KRINGS, DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

Mr. KRINGS. Thank you, Mr. Chairman and members of the committee. I am pleased to have this opportunity to be with you today to discuss the role of test and evaluation in the defense acquisition process.

I have a statement for the record that I wish to be entered, please.

The CHAIRMAN. Without objection.

Mr. KRINGS. This is a subject of critical important. It's of equal importance that it be correctly understood. If it is, we can significantly improve the way we acquire the tools of national defense. If it is not, we can be set back dramatically.

Once more the air is filled with proposals to rearrange—yet again—the organization of the defense acquisition system: proposals for a Defense Acquisition Corps within the Department of Defense; for a centralized Defense Procurement Agency outside the Department of Defense, and for various other structural shakeups.

As these and other ideas are considered, there is one thing that must never be lost sight of: No matter how the defense acquisition system is organized, the acquisition process must be disciplined. The best organization chart in the world is meaningless if the process it is supposed to serve is not disciplined.

The key to a disciplined acquisition processed is early and continuous, independently conducted, assessed, and reported operationally oriented test and evaluation.

As I have been telling anyone who would listen for the last few years, this requires setting aside a lot of cherished biases about test and evaluation and the way it should be done and reported.

It requires agreement within and between both the Executive and Legislative branches, and that the purpose of the defense acquisition process is to acquire weapon systems that work the way the users want them to work, and to do so on a timely and cost-effective basis. Period. That's what we're all here for. It requires recognition of the fact that, for the process to do this, decision-makers must have the benefit of unbiased expert assessments of progress toward the goal of satisfying user needs—all the way from the cradle to graduation.

This means we have to stop thinking about test and evaluation in terms of such outmoded labels as "operational" T&E and "development" T&E. Instead, we must think of T&E in terms of "make it work" and "does it work?"

The former, "make it work" test and evaluation is a tool used by the development community as it labors to create and build weapon systems and equipment to meet operational user requirements. As such, it should be conducted and overseen by the research, development, and acquisition side of our house—the contractors, the developing services, the DARPAs, DDR&Es, and USD(A)s.

The "does it work?" T&E, including the traditional "final exam" operational test, is used to determine whether developers are making satisfactory progress toward or have succeeded in meeting operational, that is, user, requirements.

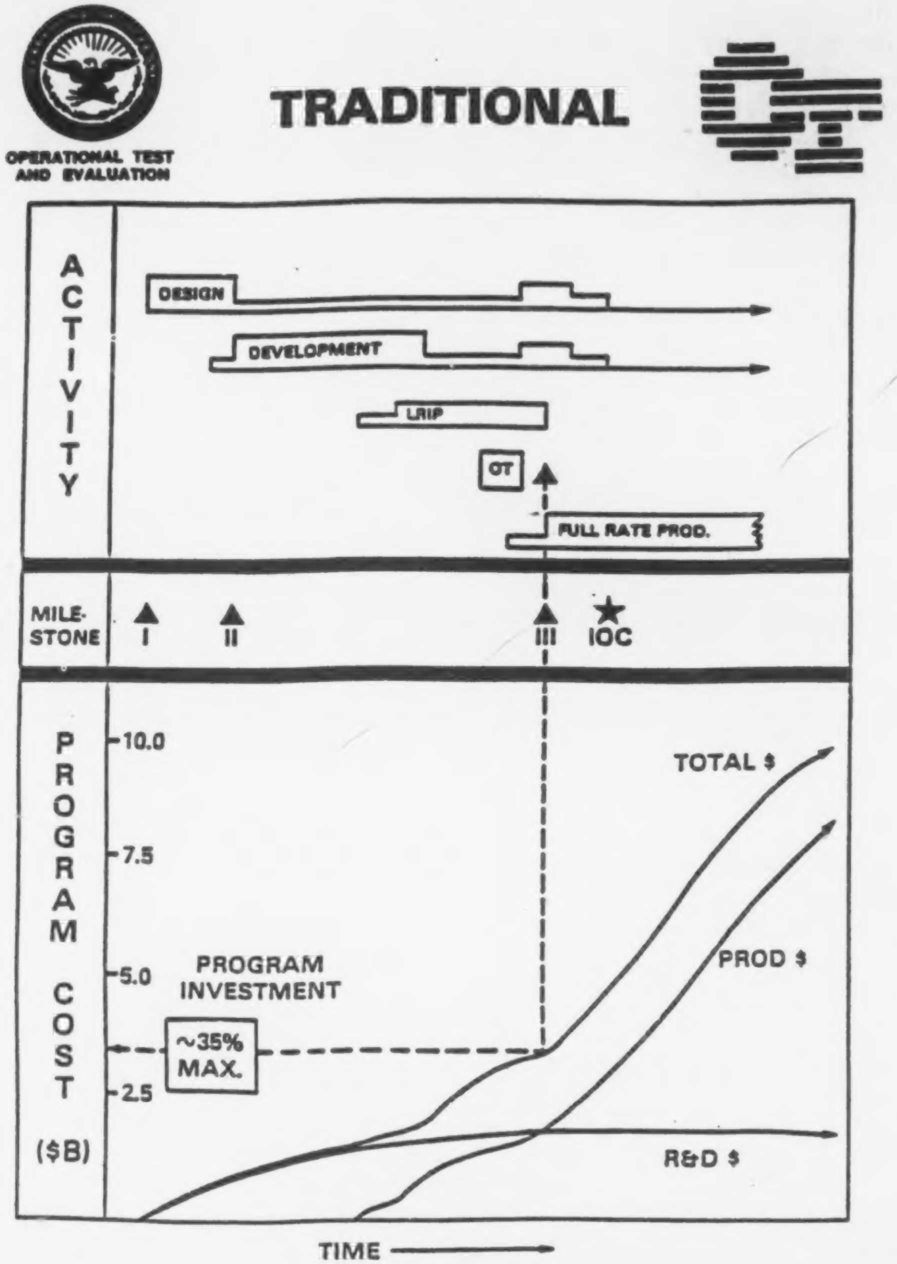
To assure that procurement decisions are informed decisions, the "does it work?" testers must be in a position to objectively and candidly report their assessments to all the decision-makers throughout the life of every major acquisition program.

This means that "does it work?" test and evaluation must be carried out by independent test organizations under the oversight of an OSD-level office such as ours—which is independent of all development, acquisition, and system advocacy groups.

Test and evaluation carried out, overseen, and reported as suggested here can tell decision-makers whether a program is making acceptable progress toward the goal of meeting the user's operational requirements. It provides an objective basis for managing the commitment of funds, controlling the advancement of the program from one stage to another, and so on.

If cradle-to-graduation independent T&E oversight and reporting is the key to a disciplined acquisition process in an overall sense, it is of particular and absolutely critical importance to so-called concurrent programs. In such programs, development, production, and test and evaluation in some measure take place in parallel rather than serially. This means a substantial investment of taxpayers' dollars is made well before objective, operationally oriented test and evaluation is conducted.

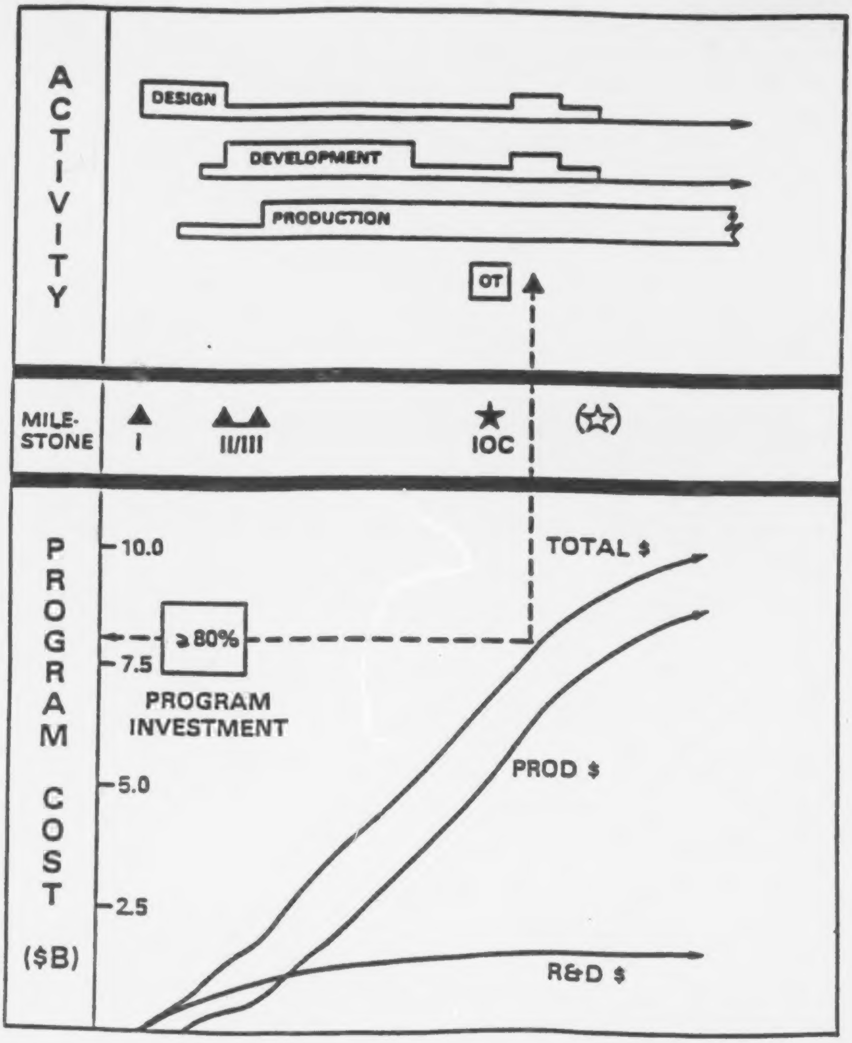
This is dramatically illustrated in two charts that I think you have before you. The first chart shows what characteristically is a traditional program. It shows the design and development process under the upper group in the Activity area and then we go into the little blue box that says "low rate initial production."



The first independent activity, objective activity, that goes on is the OT, which is the red box, and it reports—if you look down there it's prior to Milestone III, before going to full-rate production. If we look at sort of a generic program of $10 billion and a typical line that represents R&D and production dollars—in total dollars—we will find that at that point at which the first objective assessment evaluation is reported, we have about 35 percent of the program spent. This is common for a large ticket item program.

OPERATIONAL TEST
AND EVALUATION

CONCURRENT



The next chart you'll see is a Concurrent Program. There you can see in the Activity that we're overlapping design development and production in a more parallel effort as opposed to a serial effort. The consequences are obvious: when we do a Milestone II and III, we are basically going into full-scale development and starting production at the same time.

The red box which is the first independent objective operational test, comes at this point at about 80 percent of the investment. Obviously, at this point we have a significant amount of the dollars for the whole program invested before the objective assessment is made.

What we propose is that we review, very seriously, how we report testing in a concurrent program. This is, as you can see, typically in a traditional high-unit cost program about one-third of the dollars are invested, and in a concurrent program the average figure is in the order of 80 percent. I think of all the next trillion dollars we have scheduled, it really averages about 50 percent in the concurrent and non-concurrent programs.

In these cases, it is vital that operationally, user need oriented evaluations of all available data is made, independently assessed, and objectively reported on a continuous basis, and from the earliest possible moment to maximize the chances for genuine success—a system that really works the way the user wants it to, and minimize the risk of failure—wasted billions of dollars and years, and users left empty handed in the field.

I am neither for nor against concurrency—such risk versus reward decisions must be made by DOD acquisition executives based on the CINCs requirements. The most significant motivation for concurrency is the lack of existence of equipment that we need—but I recognize concurrency's existence and the difficulty as a program acquisition strategy. Given that, our office must address the decision-makers' need for objective, operationally oriented information virtually from scratch and at every critical decision point along the way to a full-production decision.

To do this, working with the services' operational test agencies we have developed two new assessment tools. The first is the Early Operational Assessment—or an EOA—and second is the Systems Maturity Matrix.

If traditional dedicated operational testing is thought of as the final exam preceding a full-production decision, then EOAs, or early assessments, are periodic quizzes leading up to that exam. They permit problem areas to be identified and dealt with early on.

The C-17A program was the first major acquisition program to use an EOA as a decision-making tool. Using the Critical Operational Issues in the program's Test and Evaluation Master Plan—the TEMP—as a framework, the assessments highlighted areas of risk that could affect the aircraft's overall operational capabilities. This was the first in a series of C-17 EOAs that will be updated and presented to our office annually.

The Systems Maturity Matrix was developed as an adjunct to the assessment. This document, agreed upon by our office and the developing services at the beginning of a program, spells out for each and every major decision milestone what testing will have been completed, what testing is designed to show, and what system capabilities will have been demonstrated.

The matrix is not intended to set pass/fail criteria, but rather to permit objective qualitative assessment of a system's progress toward fulfilling the user requirements. It is designed to enhance the T&E community's ability to give decision-makers meaningful, objective information on which to base critical program decisions.

The B-2 program is the Systems Maturity Matrix pioneer, and the C-17 Acquisition Decision Memorandum requires that a maturity matrix be evaluated as part of that program's annual EOAs.

We intend to incorporate maturity matrixes into most major acquisition programs which contain significant degrees of concurrency, and EOAs will be employed in every program under our office's oversight.

The discipline we bring to the acquisition system is milestone progress that is event based—milestones of demonstrated achievement.

In sum, the role of test and evaluation in the acquisition process is to provide the discipline necessary to give users weapon systems and equipment that work the way they need them to, and to get them fielded when they need them. To do this job, it must be operationally oriented, continuous from the beginning and throughout every program's life—and, above all, independently conducted, assessed, and reported—reported with candor and objectivity.

This is what our office seeks to bring to the table every day with the aim of continuous improvement of the defense acquisition process—improvement that's always being measured in terms of user satisfaction: Do the men and women in the field get what they want and need, when they want it, and when they need it?

Does it do the job they want it to do?

Do they consider it reliable and maintainable?

These are the questions we ask ourselves every day, and these are the standards by which we measure our fulfillment of the role of test and evaluation in the defense acquisition process.

Thank you, and I will be happy to answer questions when it's time.

PREPARED STATEMENT OF MR. JOHN E. KRINGS, DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

Mr. Chairman, members of the subcommittee -- I am very pleased to have this opportunity to be with you today to discuss the role of test and evaluation in the defense acquisition process.

This is a subject of critical importance. It is of equal importance that it be correctly understood. If it is, we can significantly improve the way we acquire the tools of national defense. If it is not, we can be set back dramatically.

Once more the air is filled with proposals to rearrange -- yet again -- the organization of the defense acquisition system . . . proposals for a "Defense Acquisition Corps" within the Department of Defense . . . for a centralized "Defense Procurement Agency" outside the DoD . . . and for various other structural shakeups. As these and other ideas are considered, there is one thing that must never be lost sight of: No matter how the defense acquisition system is organized, the acquisition process must be disciplined. The best organization chart in the world is meaningless if the process it is supposed to serve is not disciplined . . .

And the key to a disciplined acquisition process is early and continuous, independently conducted, assessed, and reported operationally oriented test and evaluation.

As I have been telling anyone who would listen for the past four years, this requires setting aside a bundle of cherished biases about T&E and the way it "should" be done and reported. It requires agreement within and between both the executive and legislative branches that the purpose of the defense acquisition process is to acquire weapon systems that work the way the users want them to, and to do so on a timely and cost-effective basis. Period. It requires recognition of the fact that, for the process to do this, decision makers must have the benefit of unbiased expert assessments of progress toward the goal of satisfying user needs -- all along the way . . . from "cradle to graduation."

This means we have to stop thinking about T&E in terms of such outmoded labels as "operational" T&E and "development" T&E. Instead, we must think of T&E in terms of "make it work" and "Does it work?"

The former -- "make-it-work" T&E -- is a tool used by the development community as it labors to create and build weapon systems and equipment to meet operational -- user -- requirements. As such, it should be conducted and overseen by the research, development, and acquisition side of the house -- the contractors, the developing Services . . . the DARPAs, DDR&Es, and USD(A)s.

"Does-it-work?" T&E -- inlcuding the traditional, "final exam" operational test -- is used to determine whether developers are making satisfactory progress toward or have succeeded in meeting operational -- user -- requirements. To assure that procurement decisions are informed decisions, the "Does-it-work?" testers must be in a position to objectively and candidly report their assessments to decision makers throughout the life of every major acquisition program. This means that "Does-it-work?" T&E must be carried out by independent test organizations under the oversight of an OSD-level office such as mine -- which is independent of all development, acquisition, and system-advocacy groups.

Test and evaluation carried out, overseen, and reported as suggested here can tell decision makers whether a program is making acceptable progress toward the goal of meeting the user's operational requirements. It provides an objective basis for managing the commitment of funds, controlling the advancement of the program from one stage to another, and so on.

If "cradle to graduation" independent T&E oversight and reporting is the key to a disciplined acquisition process in an overall sense, it is of particular and absolutely critical importance to so-called concurrent programs. In such programs, development, production, and T&E in some measure take place in parallel rather than serially. This means a substantial investment of taxpayer's dollars is made well before objective, operationally oriented T&E is conducted.

This is dramatically illustrated in the two charts you have before you. As you can see, typically, in a traditional, high-unit-cost program about one-third of program dollars is invested by the time the T&E "final exam" is conducted. In a concurrent program, however, the average figure is on the order of 80-plus percent.

In these cases, it is vital that operationally -- user need -- oriented evaluations of all available data be made, independently assessed, and objectively reported on a continuous basis and from the earliest possible moment to maximize the chances for genuine success -- a system that really works the way the user wants it to -- and minimize the risk of failure -- wasted billions, wasted years, and users left empty-handed in the field.

I am neither for nor against concurrency -- such risk versus reward decisions must be made by the DoD Acquisition Executive based on the CINCs' requirements -- but I recognize concurrency's existence and difficulty as a program acquisition strategy. Given that, my office must address the decision makers' need for objective, operationally oriented information virtually from scratch and at every critical decision-point along the way to a full-production decision. To do this, working with the Services' operational test agencies we have developed two new assessment tools: the Early Operational Assessment -- or EOA -- and the Systems Maturity Matrix.

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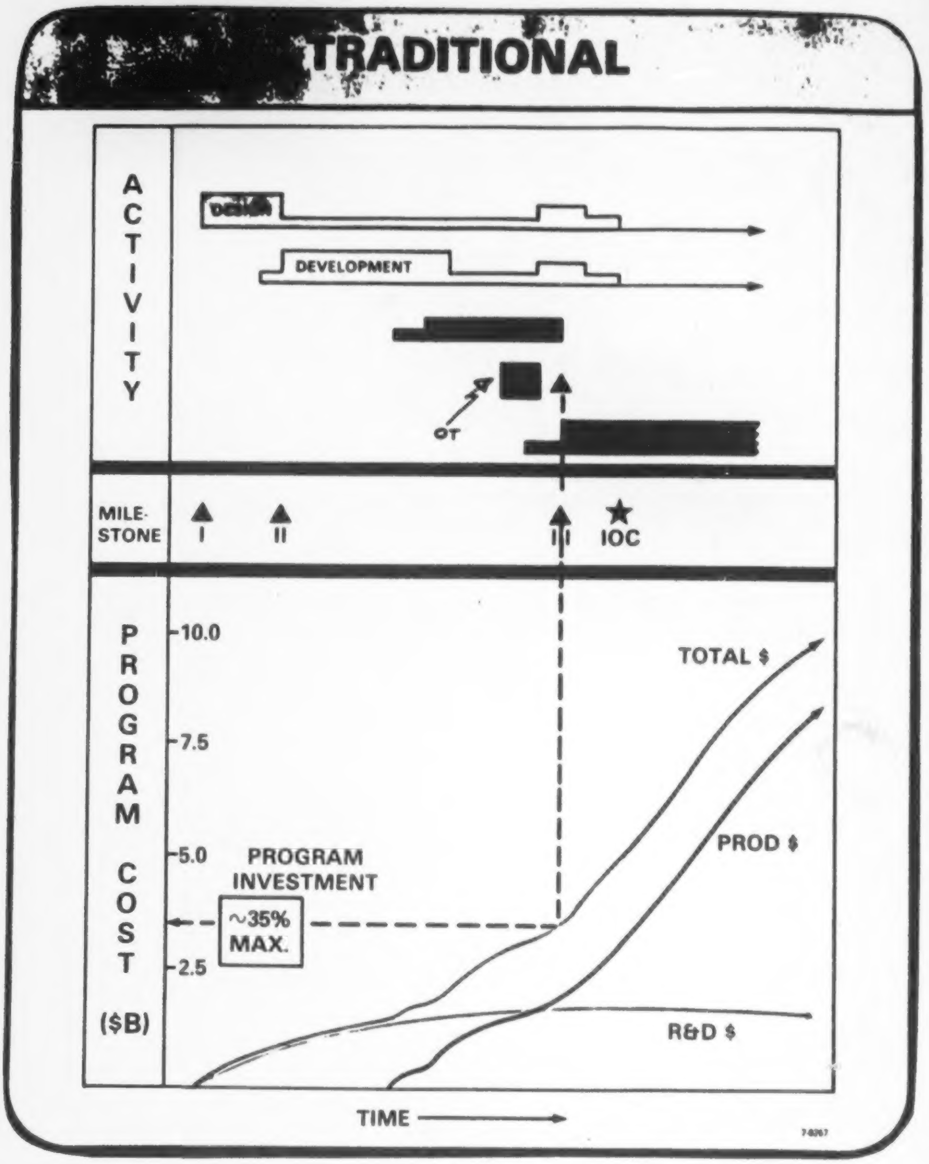
The Systems Maturity Matrix was developed as an adjunct to the EOA. This document, agreed upon by our office and the developing Service at the beginning of a program, spells out for each and every major decision milestone what testing will have been completed, what testing is designed to show, and what system capabilities will have been demonstrated. The matrix is not intended to set pass/fail criteria, but rather to permit objective qualitative assessment of a system's progress toward fulfilling user requirements. It is designed to enhance the T&E community's ability to give decision makers meaningful, objective information on which to base critical program decisions.

The B-2 program is the Systems Maturity Matrix pioneer, and the current C-17 Acquisition Decision Memorandum requires that a maturity matrix be evaluated as part of that program's annual EOAs. We intend to incorporate maturity matrixes into most major acquisition programs with significant degrees of concurrency, and EOAs will be employed in every program under our office's oversight.

In sum, the role of test and evaluation in the acquisition process is to provide the discipline necessary to give users weapon systems and equipment that work the way they need them to, and to get them fielded when they need them. To do this job, it must be: operationally oriented . . . continuous from the beginning and throughout every program's life . . . and -- above all -- independently conducted, assessed, and reported -- reported with candor and objectivity.

This is what our office seeks to bring to the table every day -- with the aim of continuous improvement of the defense acquisition process . . . improvement always being measured in terms of user satisfaction: Do the men and women in the field get what they want and need when they want and need it? Does it do the job they want it to do? Do they consider it reliable and maintainable? These are the questions we ask ourselves every day. These are the standards by which we measure our fulfillment of the role of test and evaluation in the defense acquisition process.

Thank you, Mr. Chairman. I will be happy to answer any questions you and the members of the subcommittee may have.


TRADITIONAL
ACTIVITY
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III
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PROGRAM COST ($B)
10.0
7.5
5.0
2.5
TOTAL $
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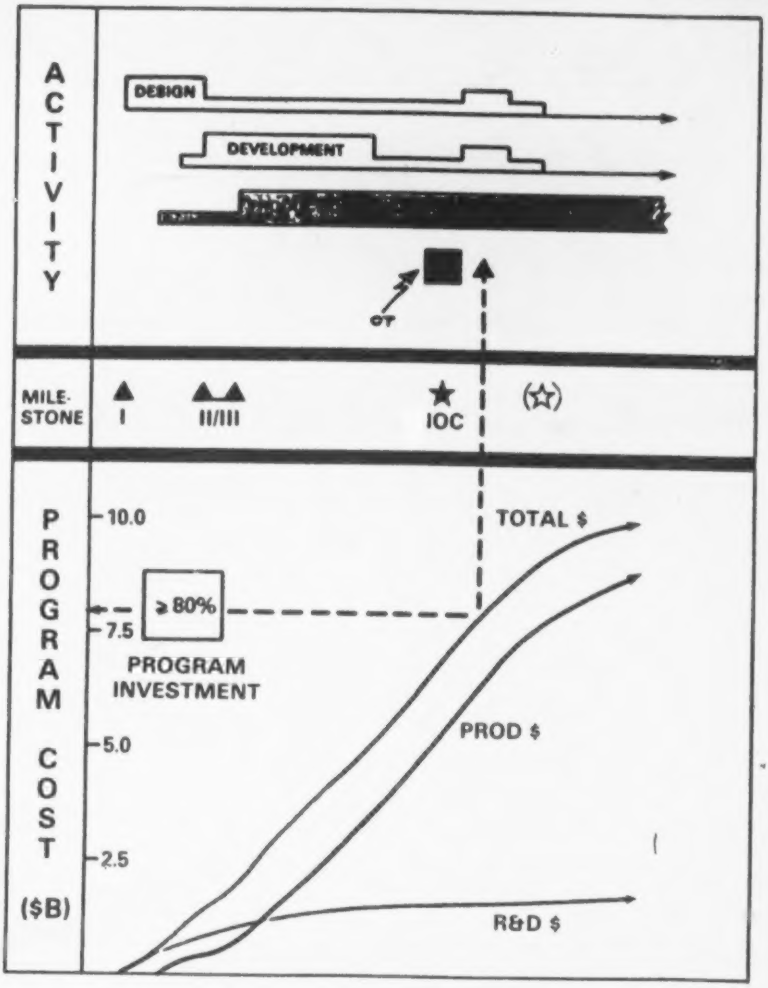
R&D $
PROGRAM INVESTMENT
~35% MAX.
TIME
7-8067

CONCURRENT


ACTIVITY
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MILE-STONE
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(☆)
PROGRAM COST ($B)
10.0
7.5
5.0
2.5
≥ 80%
PROGRAM INVESTMENT
TOTAL $
PROD $
R&D $

Dr. DUNCAN. Mr. Chairman, the next statement will be made by Pete Adolph, who is the senior person on the staff of the Secretary of Defense responsible for development test and evaluation.

STATEMENT OF CHARLES E. ADOLPH, DEPUTY DIRECTOR, DEFENSE RESEARCH AND ENGINEERING (TEST AND EVALUATION) DEPARTMENT OF DEFENSE

Mr. ADOLPH. Mr. Chairman, members of the committee:

I am Pete Adolph, the Deputy Director of Defense Research and Engineering for Test and Evaluation. I have a statement for the record that I wish to be entered.

The CHAIRMAN. Without objection.

Mr. ADOLPH. I will provide a brief response to several of the questions you asked. Dr. Duncan and Mr. Krings have already provided some of the answers to some of the questions, and Jim O'Bryon will follow me to answer questions concerning in the Live Fire Test issues.

First, let me address the overall scope of development test and evaluation (DT&E). DT&E is an ongoing process involved throughout most acquisition programs. It's of primary importance in conducting testing that determines if the developmental system meets the technical requirements of the contractual development specification. We evaluate the results of technical testing, not only against technical specifications, but also to provide information from which early insights regarding potential operational effectiveness and suitability may be drawn.

Further, we share the results of development testing with Mr. Krings and his staff so that he can independently evaluate results of technical testing in forming his early operational assessments.

My office establishes the overall policies for the conduct of development test and evaluation. In addition, we oversee development test and evaluation on major acquisition programs.

The principal oversight mechanisms we employ are:

The Test and Evaluation Master Plan, or TEMP, and I'll talk more about that later;

field visits by myself and my staff to view selected testing;

system test reports from the development test and evaluation agencies within the services—we don't actually do any testing ourselves, and formal and informal briefings from the development test and evaluation agencies and the service developer.

As was pointed out by Dr. Duncan, we participate in the preparation and conduct of each program milestone review by the Defense Acquisition Board structure. Before each milestone review, we hold a specific Test and Evaluation review, generally several days to a few weeks prior to the formal DAB review.

At the Test and Evaluation review, we specifically address with the developing service, any areas where unresolved test and evaluation concerns remain. For each milestone, including the production decision, I report to the Defense Acquisition Board structure on the scope of the development test and evaluation that has been accomplished and the principal findings from that testing.

Finally, as needed, the Director of Defense Research and Engineering, Dr. Duncan, represents any unresolved T&E issues or concerns at the formal Defense Acquisition Board review. I should say development test and evaluation concerns, and Mr. Krings represents the operational concerns.

One of the questions you asked was, what is done if and when milestones are not met?

At each program milestone, such as entry into full-scale development, the developing agency is required to detail a variety of critical cost, schedule, and performance thresholds tied to the program milestones. The Test and Evaluation Master Plan details specific developmental objectives and performance thresholds or criteria that must be achieved prior to entry into dedicated operational testing, as well as the critical technical thresholds against which test progress will be measured at each milestone.

The fact that a program threshold is exceeded, or that a required threshold is not met at a program milestone, does not, in itself, necessarily warrant program cancellation or restructure. It does, however, require a careful, senior-level examination of the significance of the shortfall to the operational effectiveness, suitability, cost and schedule of the system. No arbitrary rigid criteria can, or should, be substituted for carefully reasoned judgments.

Another question you asked was what is being done to reduce risk to a minimum.

From the point of view of test and evaluation, the best tool we have for reducing risk is early, detailed test planning; test execution; and reporting.

Thorough development testing requires early planning attention. The Department tester has to understand the operational requirements, the threat, and the operational environments in which the weapon system will be used. He must understand where the technical hurdles lie, for this provides focus for the testing.

He must ensure that the developing system and its interfaces to other elements are tested throughout its performance envelope, across the operational environment, and in the presence of appropriate surrogate, or where available, actual threats.

The final result is that thorough development testing takes resources which are funding, time, and qualified people. These will only be present when needed if thorough early planning is accomplished.

The key tool for ensuring this early attention to T&E planning is the Test and Evaluation Master Plan that I alluded to earlier. The TEMP is written by the developing service. It must be approved jointly by Mr. Krings and myself before any testing can begin.

I want to emphasize that there is always some risk associated with any test involving high technology systems.

Early planning; allocation of sufficient resources; and a structured test program that begins with the component level, subsystem level, and finally full-up system testing are the keys to reducing development test risks.

You also asked when and how concurrency can be justified.

It should be noted that some concurrency, with its attendant risks, is the norm in most development programs. Some types of concurrency are necessary attributes in a well-structured program. For example, a program should not proceed serially from a development phase that focuses only on design, to a production phase that addresses producibility and cost. Instead, we expect a form of concurrency throughout each development phase—a concurrency that integrates the concerns and considerations of future phases into the activities of the ongoing phase.

The type of concurrency that is of concern is that of entry into high rate production before the activities normally associated with full-scale development or test and evaluation on the basic system have been completed.

The decision to proceed with a concurrent program of this type is an acquisition decision, not a test decision. Test considerations are only one aspect that must be considered in making such a decision.

As Mr. Krings pointed out, the primary factors that would justify approving and proceeding with a highly concurrent program are the urgency of the military requirement and an assessment of the technological risks involved.

PREPARED STATEMENT OF CHARLES ADOLPH, DEPUTY DIRECTOR, DEFENSE RESEARCH AND ENGINEERING FOR TEST AND EVALUATION, DEPARTMENT OF DEFENSE

Mr. Chairman and Members of the Committee:

I am Charles Adolph, the Deputy Director of Defense Research and Engineering for Test and Evaluation. I appreciate the opportunity to appear before you today to discuss the role of development test and evaluation in acquisition decision-making.

In preparation for today's hearing, the committee proposed five questions dealing with various aspects of acquisition decision making. At this time, I will provide a brief response to several of those questions. Dr. Duncan and Mr. Krings have already provided answers to some of the questions.

First, let me address the overall scope of Development Test and Evaluation (DT&E).

DT&E is an on-going process involved throughout most acquisition programs. DT&E helps to determine the readiness of technologies for application, to resolve design questions, and to measure progress of the design in overcoming development challenges. DT&E is of primary importance in conducting testing that determines if the development system meets the technical requirements of the contractual development specification. But, the scope of DT&E is much broader than technical specifications; fundamentally, DT&E, like OT&E, is concerned with the acquisition of quality systems. Therefore, we evaluate the results of our technical testing, not only against technical specifications, but also to provide information from which early insights regarding potential operational effectiveness and suitability may be drawn. Further, we share the results of development testing with Mr. Krings and his staff so that he can independently evaluate the results of technical testing in forming his early operational assessments.

My office establishes the overall policies for the conduct of DT&E and reviews the implementing policies and procedures issued by the Services. In addition, we oversee the DT&E on major as well as designated acquisition programs.

The principal oversight mechanisms we employ are:

- The Test and Evaluation Master Plan (TEMP)
- Field visits by myself and my staff to view selected testing
- System test reports from the development test and evaluation agencies within the Services
- and formal and informal briefings from the development test and evaluation agencies and the Service developer.

We participate in the preparation and conduct of each program Milestone review by the Defense Acquisition Board (DAB) structure. Before each milestone review, we hold a specific Test and Evaluation review, generally several days to a few weeks prior to the formal DAB Committee review.

For a production decision review, we ensure that virtually all DT&E on the basic system will have been completed; that any major deficiencies will have been identified, corrected, and retested. If the review is prior to a low-rate production decision, it is acceptable to have some DT&E incomplete. But for a full-rate production review, DT&E on the basic system should have been completed successfully.

At the Test and Evaluation briefing, we specifically address, with the developing Service, any areas where unresolved T&E concerns remain. For each Milestone, including the production decision, I report to the Defense Acquisition Board structure on the scope of the DT&E that has been accomplished and on the principal findings from that testing. Finally, as needed, the Director of Defense Research and Engineering represents any unresolved DT&E concerns at the formal Defense Acquisition Board review.

2. One of your questions was what is done if/when milestones are not met?

At each program milestone, e.g., entry into Full-Scale Development, approval for Full-Rate Production, etc., the developing agency is required to detail a variety of critical cost, schedule, and performance thresholds tied to the program milestones. Test thresholds are specified in greater detail in the Test and Evaluation Master Plan (TEMP), which is updated to ensure currency and completeness prior to each Milestone review.

The Test and Evaluation Master Plan details specific development objectives and performance thresholds (criteria) that must be achieved prior to entry into dedicated operational testing as well as the critical technical thresholds against which test progress will be measured at each future milestone.

The fact that a program threshold is exceeded, or a required threshold is not met at a program milestone, does not, in itself, necessarily warrant program cancellation or restructure. It does require a careful, senior level examination of the significance of the shortfall to the operational effectiveness, suitability, cost and schedule of the system. No arbitrary rigid criteria can, or should, be substituted for carefully reasoned judgments. I ensure that the scope of development testing and the results from that testing are fully considered as part of the DAB process.

3. Another question was what is being done to reduce risk to a minimum?

From the point of view of test and evaluation, the best tool we have for reducing risk is early, detailed test planning, execution, and reporting.

Thorough development testing requires early planning attention. The development tester has to understand the operational requirements, the threat, and the operational environments in which the resulting system will be used. The tester must understand the relationship between the required operational characteristics and the technical characteristics that are critical to achieving the operational performance. Finally, he must understand where the technical hurdles lie, for this provides focus for the testing. After this thorough understanding is gained, the development tester must then identify the resources he needs to conduct meaningful development testing. He must insure that the developing system and its interfaces to other elements are tested throughout its performance envelope, across the operational environments, and in the presence of appropriate surrogate threats. The final result is that thorough development testing takes resources -- funding, time, and qualified people. These will only be present when needed if thorough early planning is accomplished.

The key tool for ensuring this early attention to T&E planning is the Test and Evaluation Master Plan (TEMP). The TEMP is written by the developing Service. It must be approved jointly by Mr. Krings and myself before any testing can begin.

Clearly, one of the primary purposes of any testing is to determine if unexpected results are produced. Consequently, there is always some risk associated with any test involving high technology systems. Early planning, allocation of sufficient resources, and a structured component, subsystem, full-up system test approach are key to reducing development test risks to a minimum.

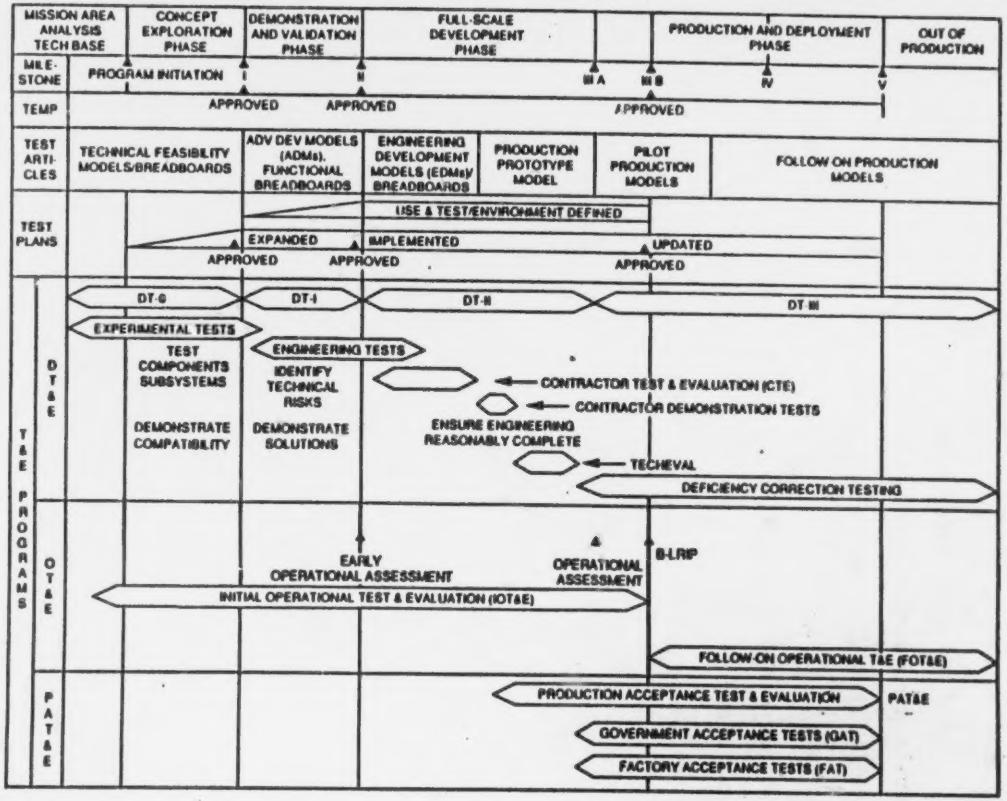
4. You also asked when/how can concurrency be justified?

It should be noted that some concurrency, with its attendant risks is the norm in most development programs. Some types of concurrency are necessary attributes in a well-structured program. For example, a program should not proceed serially from a development phase that focuses only on design, to a production phase that addresses producibility and cost, to a support phase that suffers the life-cycle consequences of the earlier phases. Instead, we expect a form of concurrency throughout each development phase -- a concurrency that integrates the concerns and considerations of future phases into the activities of the on-going phase.

The type of concurrency that is of concern is that of entry into high rate production before activities normally associated with Full-Scale Development or Test and Evaluation on the basic system have been completed. The decision to proceed with a concurrent program of this type is an acquisition decision. Test considerations are only one aspect that must be considered in such a decision.

The primary factor that would justify approving and proceeding with a highly concurrent program is the urgency of the military requirement and the technological risks involved. However, I believe that the full scope of the issues that are involved are best and properly addressed from the perspective of the Under Secretary for Acquisition, rather than limiting it to a test perspective.

LIFE CYCLE EVENTS


MISSION AREA ANALYSIS TECH BASE
CONCEPT EXPLORATION PHASE
DEMONSTRATION AND VALIDATION PHASE
FULL-SCALE DEVELOPMENT PHASE
PRODUCTION AND DEPLOYMENT PHASE
OUT OF PRODUCTION
MILE-STONE
PROGRAM INITIATION
I
II
III A
III B
IV
V
TEMP
APPROVED
APPROVED
APPROVED
TEST ARTI-CLES
TECHNICAL FEASIBILITY MODELS/BREADBOARDS
ADV DEV MODELS (ADMs), FUNCTIONAL BREADBOARDS
ENGINEERING DEVELOPMENT MODELS (EDMs)/ BREADBOARDS
PRODUCTION PROTOTYPE MODEL
PILOT PRODUCTION MODELS
FOLLOW ON PRODUCTION MODELS
TEST PLANS
USE & TEST/ENVIRONMENT DEFINED
EXPANDED
IMPLEMENTED
UPDATED
APPROVED
APPROVED
APPROVED
T&E PROGRAMS
DT&E
DT-0
DT-I
DT-II
DT-III
EXPERIMENTAL TESTS
TEST COMPONENTS SUBSYSTEMS
DEMONSTRATE COMPATIBILITY
ENGINEERING TESTS
IDENTIFY TECHNICAL RISKS
DEMONSTRATE SOLUTIONS
CONTRACTOR TEST & EVALUATION (CTE)
CONTRACTOR DEMONSTRATION TESTS
ENSURE ENGINEERING REASONABLY COMPLETE
TECHEVAL
DEFICIENCY CORRECTION TESTING
OT&E
EARLY OPERATIONAL ASSESSMENT
OPERATIONAL ASSESSMENT
B-LRIP
INITIAL OPERATIONAL TEST & EVALUATION (IOT&E)
FOLLOW-ON OPERATIONAL T&E (FOT&E)
PAT&E
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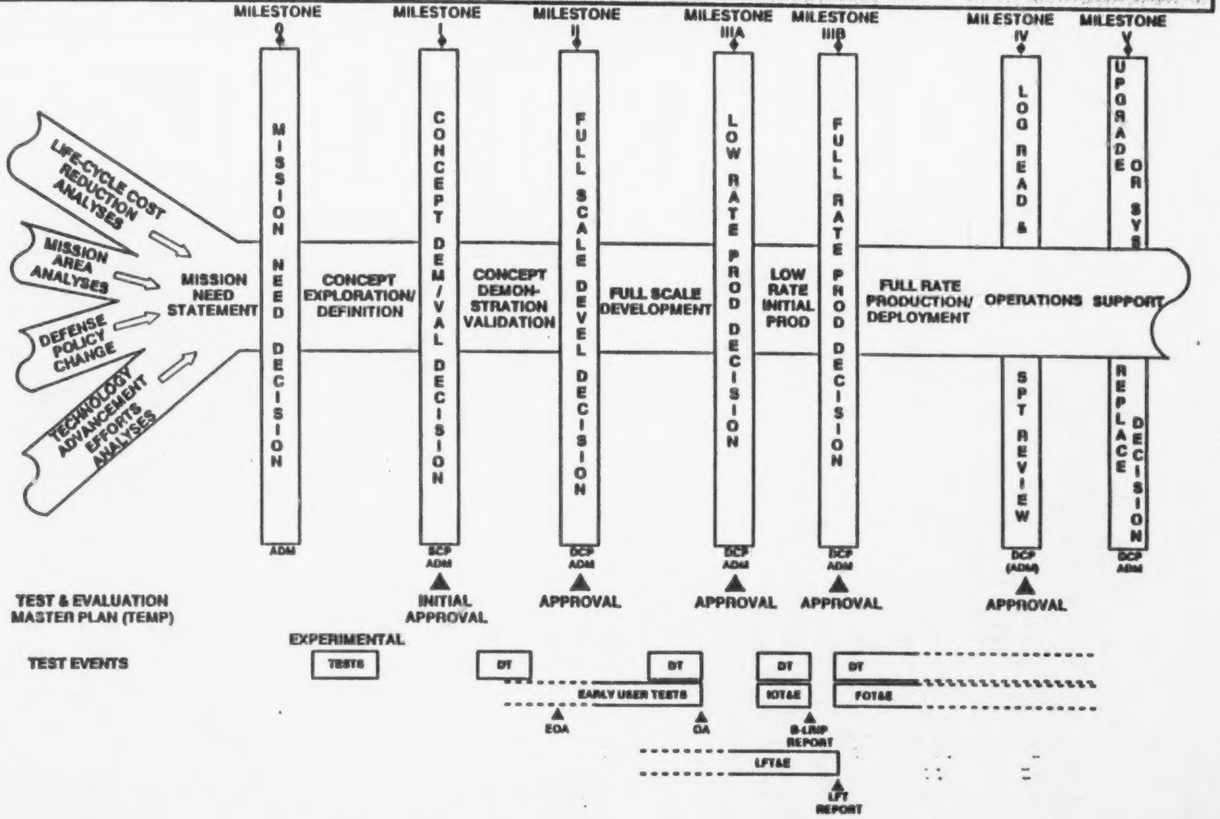
PAT&E
GOVERNMENT ACCEPTANCE TESTS (GAT)
FACTORY ACCEPTANCE TESTS (FAT)

ACQUISITION PROCESS TEST EVENTS


MILESTONE 0
MILESTONE I
MILESTONE II
MILESTONE IIIA
MILESTONE IIIB
MILESTONE IV
MILESTONE V
LIFE-CYCLE COST REDUCTION ANALYSES
MISSION AREA ANALYSES
DEFENSE POLICY CHANGE
TECHNOLOGY ADVANCEMENT EFFORTS ANALYSES
MISSION NEED STATEMENT
MISSION NEED DECISION
ADM
CONCEPT EXPLORATION/ DEFINITION
CONCEPT DEM/VAL DECISION
SCP ADM
CONCEPT DEMON-STRATION VALIDATION
FULL SCALE DEVEL DECISION
DCP ADM
FULL SCALE DEVELOPMENT
LOW RATE PROD DECISION
DCP ADM
LOW RATE INITIAL PROD
FULL RATE PROD DECISION
DCP ADM
FULL RATE PRODUCTION/ DEPLOYMENT
OPERATIONS SUPPORT
LOG READ & SPT REVIEW
DCP (ADM)
UPGRADE OR SYS REPLACE DECISION
DCP ADM
TEST & EVALUATION MASTER PLAN (TEMP)
INITIAL APPROVAL
APPROVAL
APPROVAL
APPROVAL
APPROVAL
TEST EVENTS
EXPERIMENTAL
TESTS
DT
DT
DT
DT
EARLY USER TESTS
EOA
OA
IOT&E
B-LRIP REPORT
FOT&E
LFT&E
LFT REPORT

Dr. DUNCAN. Mr. Chairman, the last prepared statement will be given by Mr. Jim O'Bryon, the Director of Live Fire Testing, which is a subset of the development test and evaluation activity.

Jim.

STATEMENT OF JAMES F. O'BRYON, DIRECTOR, LIVE FIRE TESTING, DEFENSE RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE

Mr. O'BRYON. Mr. Chairman and members of the committee:

I am Jim O'Bryon, Director of Live Fire Testing. It's a privilege to be able to appear before you today.

I have a statement which I'd like to have entered in the record in its entirety, if you wish, and I'd like to excerpt from that to save some time this morning.

Five questions were proposed by the committee. When we prepared our statement, we indicated we have addressed only four of them. The one that we weren't going to address in any length was concurrency, but I will talk to that point also just a little bit today.

Beginning with my statement I'd like to clarify my role within the Office of the Secretary of Defense. I report to Mr. Adolph, who is the Deputy Director of Defense Research and Engineering on the acquisition side of the house in the Pentagon.

The Defense Acquisition Board, or the DAB, decision to proceed with production considers several program factors. Primary Live Fire Test and Evaluation considerations in the DAB's deliberations are:

One, the results of completed Live Fire Test and Evaluation and; second, an assessment of the validity, relevance, realism, and sufficiency of the testing conducted in relationship to the programmatic decisions that must be made.

For each of the systems, within the constraints of practicality, our objective is to ensure the conduct of realistic Live Fire Testing and associated evaluation of the system configured and loaded as in combat against actual threat systems, or as against as realistic surrogates of those threat systems as can be obtained.

Live Fire Testing and Evaluation is planned throughout the development process to ensure that the resulting production systems provide the intended crew protection to realistic hostile fire, taking into equal consideration the susceptibility to attack and combat performance of the system; or, for munitions, that they produce the intended lethality against the appropriate opposing threat vehicles or structures.

The approved Test and Evaluation Master Plan and Detailed Live Fire Test Plan establish the specific Live Fire Testing that a given system will accomplish prior to the production milestone.

Clearly, if testing produces surprises, the detailed planning is adjusted accordingly, always with the prior approval and coordination with our office. I report to the DAB structure through the DDRE—as I just mentioned—on the scope of the Live Fire Testing that has been accomplished and the principal findings from that testing.

At the conclusion of all Live Fire Testing, and prior to Milestone IIIB, as included in Title 10, U.S. Code, an Independent Live Fire

Test and Evaluation assessment report is also submitted from our office, through the Secretary of Defense, to Congress.

A stated purpose of Live Fire Testing is to "allow any design deficiency demonstrated by the testing to be corrected in the design of the system before proceeding beyond low-rate initial production, or LRIP." Hence, an important element of my independent report is to highlight vulnerability or lethality deficiency issues that were determined from Live Fire Testing and to assess whether LFT conducted is valued, realistic, relevant, and sufficient for the programmatic decisions to be made by the USD(A) based upon the DAB's recommendation.

I do want to emphasize in this regard that Live Fire Test and Evaluation is not merely a pass-fail test of the system with respect to the existing design specifications, but a thorough assessment of its vulnerabilities and/or lethalities against the total threat spectrum as it is known at the time of testing. It is not merely testing to design; it's testing to the expected threat to be encountered.

I also want to emphasize the complementary roles of live fire testing and operational testing in assessing the survivability of a system. This assessment must address both the potential to being hit—the kinds of operational issues which Mr. Krings just mentioned—and the potential to keep on fighting given a hit, which we call vulnerability.

Operational testing can be especially valuable in determining susceptibility, because such testing can consist of force-on-force interactions. Typically, however, these tests are non-destructive and cannot be used to determine physical vulnerabilities because, obviously, we're using real crew and people out there during the operational tests.

Live fire testing, on the other hand, can be used to determine physical vulnerabilities through destructive testing. Both kinds of testing, therefore, are important to the DAB to be used in assessing the survivability of any given system.

Regarding minimizing program risks, live fire testing is not always popular, since it often requires shooting at and damaging relatively expensive assets. As you know, realistic Live Fire Test and Evaluation requires that the threat systems are appropriately represented—this is key. This involves expense and schedule lead times to obtain threat systems or to construct appropriate surrogates. Of course, these expenses are very small in contrast to the overall acquisition costs of a new system—usually a fraction of 1 percent—however, they are a major portion of the overall T&E budget. The results of realistic live fire testing can be dramatic—as we've seen in recent testing—in determining potential improvements to the system being acquired.

Normally, the TEMP is prepared prior to entry into Milestone I. It is updated and expanded prior to Milestone II.

As part of this early planning, my office assesses the testing that is planned throughout the development process as it relates to live fire testing. A well-structured Live Fire Test and Evaluation Program should include sufficient vulnerability and lethality testing throughout development to build confidence in the design. In fact, the legislated guidelines for live fire testing, noted above, state that live fire testing "should be carried out sufficiently early in the development phase to allow any design deficiency demonstrated by the testing to be corrected before proceeding beyond low-rate initial production."

As a consequence, the full-up live fire testing late in full-scale development or during LRIP should confirm expectations, hopefully, rather than uncover showstoppers.

There's always some risk associated with testing—we know this. For example, damage synergisms may not be detectable prior to full-up testing when everything can go wrong at the same time—Murphy's law. However, early test and evaluation planning; allocation of sufficient resources; an evaluation plan linking the various component, subsystem, and full-up tests are the keys to minimizing Live Fire Test risks.

Regarding concurrency briefly from a tester's perspective, I would clearly prefer that thorough live fire testing be conducted—I mean thorough—before quantity production begins. In fact, as the law is now written, any exception would require the approval of the Secretary of Defense, is before entering into full-scale engineering development.

If live fire testing reveals a need for changes, those changes are much more readily and inexpensively accommodated if tooling does not have to be redesigned and if produced quantities do not exist that require recall and retrofit.

The primary factor that would justify approving and proceeding with such concurrent programs would obviously be the urgency of the military requirements; for example, the outbreak of hostilities. However, I believe the full scope of factors that are involved would be best addressed from the perspective of the Under Secretary of Defense for Acquisition, who is paid to make those particular decisions.

Finally, if I believe Live Fire Test and Evaluation issues need specific attention, the DAB process provides the opportunity for me to represent my concerns. In such a case, I would participate directly in the DAB Committee review. If Live Fire Testing and Evaluation concerns were not adequately resolved after the appropriate committee review—for example, the Conventional Systems Committee—those unresolved issues would be highlighted for the formal DAB review, either by the appropriate committee chairman or via the Director of Defense Research and Engineering.

This concludes my statement, Mr. Chairman. We would be happy to take comments and questions.

PREPARED STATEMENT OF JAMES F. O'BRYON, DIRECTOR, LIVE FIRE TESTING, DEFENSE RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE

Mr. Chairman and Members of the Committee:

I am Jim O'Bryon, the Director of Live Fire Testing. I appreciate the opportunity to appear before you today.

Five questions were proposed by the Committee in preparation for this hearing. I am prepared to discuss at length only four of these questions as the subject of concurrency is beyond the scope of my office. I am, however, prepared to discuss other questions you might have concerning the role of the Live Fire Test Office in the decision process. I have also prepared a written response to the four preparatory questions which I would like to submit for the record.

1. What criteria are used in making production decisions?

The Defense Acquisition Board (DAB) decision to proceed with production considers several program factors. Primary Live Fire Test and Evaluation considerations in the DAB's deliberations are:

- **Results of completed Live Fire Test and Evaluation.**
- **An assessment of the validity, relevance, realism, and sufficiency of the testing conducted in relation to programmatic decisions that must be made.**

For each system, within the constraints of practicality, our objective is to ensure the conduct of realistic Live Fire Testing and associated evaluation of the system configured and loaded as in combat against the actual threat system, or as against as realistic

surrogates of those threat systems as can be obtained. Live Fire Testing and Evaluation is planned throughout the development process to ensure that the resulting production system provides the intended crew protection to realistic hostile fire, taking into equal consideration the susceptibility to attack and combat performance of the system; or, for munitions, that they produce the intended lethality against appropriate opposing threat vehicles or structures.

Since each system offers different opportunities for, and constraints on, realistic Live Fire Testing, we require, early - on, a Service prepared Live Fire Test and Evaluation Strategy that details how the objectives of Live Fire Testing will be met. This basic Strategy is included in the Test and Evaluation Master Plan (TEMP) that is updated prior to each Milestone Review. A Detailed Test Plan (DTP) is then submitted prior to each live-fire test event. My office is actively involved in the review of these plans to insure that they are fully responsive to the law. In the majority of cases, plans are returned for revisions and incorporation of additional and more realistic testing. As I noted, to the maximum practical extent, the approved Live Fire Test and Evaluation Strategy will involve testing of full-up full-scale systems configured for combat.

The approved TEMP and Detailed Live Fire Test Plan establish the specific Live Fire Testing that a given system will accomplish prior to the production milestone. Clearly, if testing produces surprises, the detailed planning is adjusted accordingly; always with prior review and coordination with my office. I report to the Defense Acquisition Board structure, through the DDRE, on the scope of the Live Fire Testing that has been accomplished and the principal findings from that testing. At the conclusion of all Live Fire Testing, and prior to Milestone IIIB, an independent Live Fire Test and Evaluation assessment report is also submitted through the SecDef to Congress, in accordance with Title 10, USC.

A stated purpose of Live Fire Testing is to "allow any design deficiency demonstrated by the testing to be corrected in the design of the system . . .before proceeding beyond low - rate initial production. Therefore, an important element of my report is to highlight vulnerability or lethality deficiency issues that were determined from Live Fire Testing and to assess whether the Live Fire Testing conducted is valid, relevant, realistic and sufficient for the programmatic decisions to be made by the DAB. I should emphasize, in this regard, that the live fire test and evaluation is not merely a pass-fail test of the system with respect to existing design specifications, but a thorough assessment of its vulnerabilities and/or lethalities against the total threat spectrum as it is known at the time of testing.

I would also like to emphasize the complementary roles of live fire testing and operational testing in assessing the survivability of a system. Such an assessment must address both the potential to hit (susceptibility) and the potential to keep on fighting given a hit (vulnerability). Operational testing can be especially valuable in determining susceptibility, because such testing can consist of force-on-force interactions. Typically, however, these tests are non-destructive and cannot be used to determine physical vulnerabilities. Live fire tests, on the other hand, can be used to determine physical vulnerabilities through destructive testing. Both kinds of testing, therefore, are important to the DAB in assessing the survivability of a system.

In addition to testing conducted in support of specific acquisition programs, a great deal of testing is conducted under the Joint Live Fire test program to provide important complementary information on the vulnerability or lethality of our systems. These activities are conducted at Aberdeen, MD; Wright Patterson AFB, Ohio; China Lake, California; Nevada Test Site, and other locations such as the test facility for depleted uranium testing. In the past year a comprehensive test of the Abrams was completed along with significant testing of the F-15, F-16, and F/A-18. Additionally, substantial testing of classified Soviet targets was conducted. My office was heavily involved in the review and guidance of all of these programs and my staff has been present on site observing the immediate preparation, conduct and post event assessment of these tests. We have performed our own independent assessment of each completed phase of testing.

2. What is done if/when Milestones are not Met?

The TEMP details specific development objectives and performance thresholds that must be achieved as well as the critical technical thresholds against which test progress will be measured at each future Milestone. The Live Fire Test and Evaluation Strategy contained in the TEMP, similarly, details the specific testing that must be accomplished to support the next Milestone.

The fact that a threshold is not met at a program Milestone does not, in itself, necessarily warrant program cancellation or restructure. It does require a careful, senior level examination of the shortfall and the DAB structure provides the mechanism to ensure this examination is conducted in the depth and scope warranted. In short, no arbitrary rigid criteria can or should be substituted for carefully reasoned judgments. As part of that process, I ensure that the scope of Live Fire Testing and the results and assessment of that testing are fully considered.

3. What is Being Done to Minimize Program Risk?

From the point of view of Live Fire Testing and Evaluation, the best tool I have for reducing risk is early, detailed planning.

Live Fire Testing is not always popular since it often requires shooting at and damaging relatively expensive assets. Realistic Live Fire Testing and Evaluation requires that the threat systems are appropriately represented. This involves expense and schedule lead times to obtain threat systems or to construct appropriate surrogates. Of course, these expenses are very small in contrast to the overall acquisition costs of a new system – usually a fraction of one percent – and the results of realistic Live

Fire Testing can be dramatic in determining potential improvements to the system being acquired.

Early planning ensures that an effective Live Fire Test and Evaluation Strategy is developed by the Service and approved by OSD. It allows time for the Service to budget and contract for necessary test articles, instrumentation, and range facilities, and to ensure the availability of threat systems or surrogates.

Normally, the TEMP is prepared prior to entry into Milestone I. It is updated and expanded prior to Milestone II. I would expect the TEMP update for Milestone II to provide a thorough Live Fire Test and Evaluation outline. It is most important at this time to establish the scope of testing needed and to detail the resources to enable that testing. The DAB review at Milestone II pays particular attention to the resources needed for Live Fire Test and Evaluation.

As part of this early planning, my office assesses the testing that is planned throughout the development program. A well-structured Live Fire Test and Evaluation Program should include sufficient testing throughout development to build confidence in the design. In fact, the legislated guidelines for live fire testing, noted above, state that live fire testing "should be carried out sufficiently early in the development phase . . . to allow any design deficiency demonstrated by the testing to be corrected . . . before proceeding beyond low-rate initial production." As a consequence, the full-up Live Fire Testing late in Full-scale Development or during Low-rate

Initial Production should confirm expectations rather than uncover showstoppers.

There is always some risk associated with testing. For example, damage synergisms may not be detectable prior to the full-up testing. However, early test and evaluation planning, allocation of sufficient resources, and an evaluation plan linking the various component, subsystem, and full-up tests are the keys to minimizing Live Fire Test risks.

4. When or How is Concurrency Beneficial?

There are differing aspects of concurrency. Some types of concurrency are necessary attributes in a well-structured program. For example, a program should not proceed serially from a development phase that addresses only design, to a production phase that addresses producibility and cost, to a support phase that suffers the life-cycle consequences of the earlier phases. Instead, we expect a form of concurrency throughout each development phase – a concurrency that integrates the concerns and considerations of future phases into the activities of the on-going phase.

The type of concurrency that is of concern is that of entry into high rate production before activities normally associated with Full-Scale Development or Test and Evaluation have been completed. The decision to proceed with a concurrent program of this type is an acquisition decision, and test considerations are just one aspect that must be considered in such an acquisition decision.

From the tester's perspective, I would clearly prefer that thorough Live Fire testing be conducted before quantity production begins. In fact, as the law is written, any exception would require approval by the Secretary of Defense. If Live Fire testing reveals the need for changes, those changes are much more readily and inexpensively accommodated if tooling does not have to be redesigned and if produced quantities do not exist that require recall and retrofitting.

The primary factor that would justify approving and proceeding with such a concurrent program would be the urgency of the military requirement. However, I believe the full scope of factors that are involved would be best addressed from the perspective of the Under Secretary for Acquisition, rather than from my test perspective.

5. What goes on at the DAB for Full-Scale Production?

The formal DAB review is preceded by a thorough examination of the acquisition program by the Service and the OSD staff. The DAB Acquisition Committee review addresses the overall program status, resolves any minor concerns, and highlights the major issues that must, in turn, be addressed at the formal DAB.

The formal DAB review is structured to focus upon unresolved issues of substantial program impact highlighted by the Committee review. The DAB review provides the forum in which all test concerns, to include Live Fire Test concerns can be addressed.

If I believe Live Fire Test and Evaluation issues need specific attention, the process provides opportunity for me to represent my concerns. In such a case, I would participate directly in the DAB committee review. If Live Fire Test and Evaluation concerns were not adequately resolved at the appropriate Committee review, those unresolved issues would be highlighted for the formal DAB review either by the appropriate Committee chairman or via the Director, Defense Research & Engineering.

The CHAIRMAN. Thank you very much, and thank you to all of you for presenting your testimony here this morning.

Let me ask one question and then leave it to other Members to ask.

Mr. Krings, you were saying that about 50 percent of the current programs would now be called concurrent; did I hear you correctly?

Mr. KRINGS. This is an average that we made actually a couple of years ago when Secretary Weinberger was there and the new USD(A) job was created. We looked at the future programs in the Department of Defense, and if you summed them all up, about 50 percent of the cost would be consumed in the total program before the classic operational test results came in. When I say classic operational test, I mean the full-up operational test of a production item.

The CHAIRMAN. So what you are saying is overall, the average of all the programs, 50 percent would happen before the operational test; is that correct?

Mr. KRINGS. That's correct.

The CHAIRMAN. What is the definition? Do you use that as a definition of "concurrent"? You lay out two programs in those two charts.

Mr. KRINGS. Yes.

The CHAIRMAN. One is a non-concurrent program, of 35 percent cost; the other is a concurrent program of 80 percent cost. If you had to draw a line between the concurrent or a non-concurrent, where do you put it?

Mr. KRINGS. Obviously, it's really a matter of degree. When you say traditional or serial, you're almost saying specifically there is no concurrency—then it's a matter of degree.

The CHAIRMAN. OK. In the chart that you laid out that you called the "Traditional" program; that would be no concurrency at all?

Mr. KRINGS. For all practical purposes, except for perhaps some small amounts of long lead money there is no step in——

The CHAIRMAN. The other one is a highly concurrent program?

Mr. KRINGS. Yes, 80 percent is highly concurrent.

The CHAIRMAN. Where do you differentiate between a concurrent program and a not concurrent program? I mean, what are we talking about, 50 percent?

Mr. KRINGS. I think any program in which you invest production money before OT, is a concurrent program. So it's degrees. I'm calling everything in which you go actually make a production go ahead before you have done a formal OT as a concurrent program.

The CHAIRMAN. Let me phrase the question—I would like to know of all of the current programs that we've got going now, how many would you term concurrent?

Mr. KRINGS. I couldn't do that off the top of my head.

The CHAIRMAN. Can you give us something for the record?

Mr. KRINGS. Oh, yes, absolutely.

[The following information was received for the record:]

HEARING ON WEAPON SYSTEMS TESTING AND PRODUCTION DECISION-MAKING

Question: Mr. Aspin. Mr. Krings, I would like to know all of the current programs that we've got going now, how many would you term concurrent? Can you give us something for the record?

Answer: The following lists were derived by Mr. Krings, the Director, Operational Test and Evaluation (DOT&E), from the programs for which he has oversight responsibility and include most major defense acquisition programs. Some programs were not included because they are too early in their development to resolve their acquisition strategy, the program is being restructured, etc. The definitions of concurrency and the degrees of concurrency in attachment (1) were used by DOT&E to compile this information. As indicated during the hearing, concurrency is generally viewed as the overlap in development and production of a weapon system. However, DoD does not presently have a standard definition of concurrency and its degrees. Therefore, the characterization of a program's concurrency is DOT&E's and does not necessarily represent the DoD position.

In developing definitions of the degrees of concurrency, the DOT&E used the amount of operational test and evaluation (OT&E) conducted and production decisions (low-rate and beyond low-rate) as the measure of concurrency. Programs which are considered to be in a presently concurrent status are listed in attachment (2). Attachment (3) indicates the projected degree of concurrency of programs based on their approved acquisition strategy. Programs which are beyond low-rate initial production and for which initial OT&E is completed are listed in attachment (4). Some of the programs in attachment (4) reached their present status using a nonconcurrent strategy, while others used varying degrees of concurrency. It would be very difficult to determine the actual degree of concurrency used by these programs and, since all these programs have now completed initial OT&E, it was not attempted.

It should be noted that, although DOT&E has developed these definitions of concurrency, he is not responsible for the determination of a program's acquisition strategy and therefore its degree of concurrency. Acquisition strategies are approved by the Secretary of Defense upon the recommendation of the Under Secretary of Defense for Acquisition following the deliberations of the Defense Acquisition Board.

DEFINITIONS OF CONCURRENT & ITS DEGREES USED IN COMPILING ATTACHED LISTS

DEFINITION OF CONCURRENT: A concurrent program is any program which makes or is projected to make a decision to proceed into either low-rate initial production (LRIP) or beyond LRIP before initial operational test and evaluation (IOT&E) is completed.

PRESENTLY OR PROJECTED CONCURRENT:

Presently Concurrent: A program for which a "concurrent" production decision has been made. The degrees of concurrency are defined below.

Projected Concurrent: A program for which the acquisition strategy calls for a "concurrent" production decision to be made, but the decision has not yet been made. Although the below definitions of the degrees of concurrency are worded for "Presently Concurrent" programs, they also apply to "Projected Concurrent" programs.

DEGREES OF CONCURRENCY:

Not Concurrent: A program that completes all IOT&E before making a decision to proceed into production (either LRIP or beyond LRIP).

Slightly Concurrent: A program which makes a decision to proceed into LRIP based on a completed phase of early operational test and evaluation (OT&E).

Moderately Concurrent: A program which makes a decision to proceed into LRIP before a phase of early OT&E has been completed to support this decision.

Highly Concurrent: A program which makes a decision to proceed beyond LRIP before initial operational test and evaluation is completed.

REMARKS:

(1) LRIP (as defined in the 1984 DoD Authorization Act Committee Conference language) means the production of a system in limited quantity to be used in operational test and evaluation, for verification of production engineering and design maturity, and to establish a production base prior to a decision to proceed with production.

(2) The quantitative value of LRIP is required to be specified in the Test and Evaluation Master Plan (TEMP). It is the DoD position that LRIP quantities be specified on a case-by-case basis, and not on a percentage-of-total-production basis.

Attachment (1)

PRESENTLY CONCURRENT PROGRAMS

NAVY/MARINE	ARMY	AIR FORCE	OTHER
SLIGHTLY CONCURRENT			
RAM (RIM-116A)	FAADS (LOS-F-H)	EF-111A UPDATE	
TOMAHAWK (TLAM/D)	FAADS (LOS-R)	NAVSTAR (USER EQUIP)	
MK-50	AHIP (OH-58D)	AN/ALR-62I (F-111)	
F-14D	SINCGARS (N-ICOM)	AN/ALR-56M	
SH-60F (CV HELO)			
TAOC/MCE			
ASPJ (ALQ-165)			
E-2C			
EA-6B (AVCAP)			
BIGEYE (BLU-80B)			
MODERATELY CONCURRENT			
T-45TS	ASAS/ENSCE(JTF)	MILSTAR	STU III
TRIDENT(D-5) MSL	ADDS/EPLRS	AN/ALQ-172(V)2	
	SINCGARS (ICOM)	AN/ALQ-184	
	M939A2 TRUCK	AIM-120 (AMRAAM)	
	AN/ALQ-136	NAVSTAR (SPAC/CONT)	
	AN/APR-39A		
HIGHLY CONCURRENT			
DDG-51*	MCS	B-1B	DDN
MCM-1*	REGENCY NET	PEACEKEEPER (Silo)	
AN/BSY-1		AN/ALQ-131 Rcvr/proc	
E-6A TACAMO		AN/ALQ-135 UPDATE	
MHC-51*		AN/ALQ-161 (B1-B)	
		AN/ALR-56C (F-15E)	
		OTH-B RADAR	
		ITW&A	

* Shipbuilding

Note: This list does not include Major DoD Acquisition Programs that are beyond LRIP and have completed initial operational test and evaluation.

Attachment (2)

PROJECTED CONCURRENT PROGRAMS

NAVY/MARINE	ARMY	AIR FORCE	OTHER
NOT CONCURRENT			
ROTH RADAR	FMTV	ATARS	
AN/ALR-67 (F-18)	PLS	JSTAR	
		NWS (short rng rad)	
		E-3A UPDATE	
		SRAM-T	
		AGM-130 (PWRD GBU15)	
SLIGHTLY CONCURRENT			
AAAM	FAADS (NLOS)	SRAM II	AEPDS
AIWS	FAADS (C2I)	JTIDS	
AN/SPY-1D	AAWS-M	CIS (MK-XV IFF)	
V-22	SADARM	TACIT RAINBOW	
VLA	ATACM	MIDS	
SEA LANCE		NIS	
P-3C UPDATE IV			
FIX DISTRIBUTED SYS			
LRAACA			
SM-2 BLOCK III/IIIA			
MODERATELY CONCURRENT			
SM-2 BLOCK IIIB	M109A2 155MM (HIP)	C-17A	
SM-2 BLOCK IV	AFATDS	SMALL ICBM	
ATA	NBCRS	MLS	
RIM-7M (MHIP)	LHX	ATF	
		SFW	
HIGHLY CONCURRENT			
SSN-21*		PEACEKEEPER (rail garrison)	
AN/BSY-2		ACM (Advanced Cruise Missile)	
UHF FOLLOW-ON COMM		B-2	

* Shipbuilding

Attachment (3)

PROGRAMS THAT ARE BEYOND LRIP AND FOR WHICH IOT&E IS COMPLETED

NAVY/MARINE

LAMPS MK III
MK-48 ADCAP
S-3B (WSIP)
TOMAHAWK (TLAM/C)
TOMAHAWK (TLAM/N)
TOMAHAWK (TASM)
TMPC
CG-47
AN/SQR-19
A-6E
AIM-54C (PHOENIX)
AV-8B
F-14A
F/A-18
CH/MH-53E
LCAC
PHALANX CIWS
HARPOON
FFG-7
SM-2 BLOCK II
LSD-41
TRIDENT SUB
SSN-688
AN/SPY-1B
HARM (AGM-88A)
AIM-7M (SPARROW)
AN/SQS-53C

ARMY

STINGER
PATRIOT
AH-64
UH-60A
CH-47D
HELLFIRE
9MM PER DEF WEP
HMMWV
MIA1 ABRAMS
BRADLEY FVS
COPPERHEAD
MLRS
PERSHING II
M9 ACE
TOW 2
MSE

AIR FORCE

C-5B
ACLM
GLCM
DSP
DSCS III
LANTIRN
F-15
F-16
MAVERICK (AGM-65G)
MC-130H
DMSP

OTHER

Attachment (4)

The CHAIRMAN. I'm trying to find the problem. I have two questions. Number one, of the current programs that we've got, what degree of concurrency do we have? Second, are we moving toward more concurrency or less? How does it compare to what that would look like 3 years ago, 6 years ago, or something else? Can you answer that question?

Are we moving toward more concurrency or less in our acquisition programs?

Mr. KRINGS. We are redefining. I'm not trying to avoid the answer. The fact is we're changing the way we do operational testing. So if one were to define a concurrent program as where the first objective operational test came—which is the definition here—we're changing this with some of the activities that we're doing by doing operational assessments early.

By the old definition, I guess I would have to say we're going more toward concurrency than away from concurrency.

The CHAIRMAN. That was my impression, too.

Mr. KRINGS. Now, I must add that that's the initial plan for the program. Now, in many cases the test results and the budgetary results all tend to de-concurrentize the program, if you will, or bring the more traditionally. Because as the money gets stretched out, or the test process shows problems, the program moves to the right and, consequently, the concurrency is significantly reduced. We never generally increase concurrency.

The CHAIRMAN. In any case, your impression is that based upon original plans—never mind what gets stretched out because of budget squeezes or restructuring by Congress; I guess we get in there and do it on a couple of big ones, but not on a lot of them—basically the system, in your sense, was moving toward a program of more concurrency?

Mr. KRINGS. That's just an impression. It is not difficult to find that out more accurately.

The CHAIRMAN. Please help us, will you?

Mr. KRINGS. Yes, I will.

The CHAIRMAN. What is the justification again for concurrency?

Mr. KRINGS. I think it was general consensus that concurrency is mostly justified for need, for urgent operational need. There have been arguments that concurrency is justified to save time and money. That's a goal, not necessarily a historical event.

The CHAIRMAN. What does history say about the attempt to save time and money through concurrency?

Mr. KRINGS. In some cases it's true, but generally it really isn't very true.

The CHAIRMAN. That's my impression, too.

Mr. KRINGS. I might add, though, that doesn't necessitate giving it up—it should suggest doing it better.

The CHAIRMAN. All right.

If you laid out two goals for concurrency or two reasons for having a concurrent program, one of them is to save money because of the—if everything works, sure; it's useful, it does save money. However, the point is that in a lot of cases it doesn't. You probably save time over the long run. Your attempt to save time often works to the detriment that something turns up that we didn't anticipate.

So then the other question is, is a need to get something into the system so important that you have got to go to high concurrency?

Mr. Krings. That's what we allege should be judged by the acquisition process.

The Chairman. But basically, in your view that's the only really legitimate reason for concurrency?

I'm trying to find out what is the really legitimate reason.

You argue that it saves time; if everything works fine, it doesn't, but historically it has not worked out too well. So the question, then, the argument for concurrency is if you really have a piece of equipment that is absolutely vital that exercises or setup is necessary and it's important just to go ahead and get that thing into the inventory, then you have a highly concurrent program.

Mr. Krings. Yes, and I think in that particular case you really don't have any other alternatives. In the money and time-saving effort, I, again, would not like to capitulate. It can be done. We've proven that it can be done. It's just difficult.

The Chairman. How do you judge, then, between—and you're starting up a program, and you say, yes, we can save some time and money on this program if we make it highly concurrent. But history has shown that when we move to highly concurrent programs we often run into difficulty; what does that tell you?

Mr. Krings. Personally, I believe that there are ways to look at programs when they are initially determined justified in concurrency and see what the probable success of concurrency is.

The Chairman. What would be those factors?

Mr. Krings. Many things.

The Chairman. Here's our problem, Jack, don't be so obtuse. Basically, what we're trying to understand is, that, yes, there is some need for some concurrency. Also, we need some criteria for deciding when concurrency makes sense and when it doesn't make sense.

Mr. Krings. One of the most simplistic things is has the program manager ever done a concurrent program before? Has the service been successful in doing concurrent programs? Are those type of weapon systems have any track record of successful concurrent programs?

Look at the upfront testing. Clearly, that's a very good measure; the pre-testing and the sophistication of the test activity that goes; whether the funding has been done properly to put the dollars upfront that are really necessary. We know that the concurrent programs require significant front-loading to be successful.

You can look at other successful concurrent programs and see if there's an emulation of that. We don't do that very well. We don't look clearly at the probability of success in concurrency as well as we could.

The Chairman. Now, how would you build in all of those criteria into the system so that we would get and fund—as you say, it's not an either/or but more or less—how do you build into the system a process whereby we have concurrent programs, only those programs which have a high probability of success and we don't do it with the programs that don't? How do you make that happen?

Mr. Krings. Through the DAB process. The DAB process has already included a significantly greater number of decision-making assessments at each one of these DABs than we ever had in the past; far better than we ever had in the past. We look at the acquisition strategy much more closely, and the proponent from the service must justify the acquisition strategy in dollars or cents or in risk versus policy. We don't do acquisition strategy as a function of policy anymore. It has to be defined and assessed.

The same thing in terms of whether it's highly concurrent or partially concurrent. We're beginning to learn and we're beginning to bring to the DAB process those sort of decision-making tools that will say, all right, before you can go on to this highly or moderately concurrent program, show us, defend the concurrency with some basis that says what the risk of this is. It's an evolving process that I think the discipline is growing.

The CHAIRMAN. It's the Defense Acquisition Board that has the final say as to whether this is concurrent or not?

Mr. KRINGS. They approve the program strategy, so that's true, yes.

The CHAIRMAN. OK. You're saying that they are now much more conscious of and taking account of these factors?

Mr. KRINGS. Much more.

The CHAIRMAN. OK. What does the record show? Have we got better results with concurrent programs now than we had before?

Mr. KRINGS. We are reducing concurrency in a number—I would say that there are; I don't know what the percentage is, but there's a significant percentage of programs that have recently gone through the DAB process in which the concurrency has been reduced because of risk; and that more checks and balances have been put into the program because of its concurrency.

So they are really doing two things: They are either reducing the concurrency where it's not necessary or is higher risk. In those in which it's justified, they're putting in more checks and balances to make these assessments. We're doing event based activity now as opposed to calendar based, which helps this concurrent program quite a bit.

I'm not trying to advertise that we've solved everything. But the direction is clearly going toward a much, much higher level of discipline.

The CHAIRMAN. Is there statistical evidence to show this?

Mr. KRINGS. Yes, absolutely.

The CHAIRMAN. You will provide it for us?

Mr. KRINGS. Yes.

The CHAIRMAN. Thank you.

[The following information was received for the record:]

HEARING ON WEAPON SYSTEMS TESTING AND PRODUCTION DECISIONMAKING

Question. Is there statistical evidence to show that the Department of Defense is obtaining better results with concurrent programs than we had before?

Answer. The Department of Defense does not presently have standard definitions of concurrency and its degrees, and Mr. Krings has only recently developed his definitions. In addition, the effects of recent Defense Acquisition Board (DAB) decisions will, in many cases, not be determined for several years. Therefore, no statistical evidence can be provided on the improvements in concurrent programs. However, as indicated by Mr. Krings in his 8 March 1989 testimony to Subcommittee on Procurement and Military Nuclear Systems of the House Armed Services Committee, the DAB process has begun to bring more decision making tools and discipline to the acquisition process. The result is that the concurrency of a weapon system program is carefully considered and a concurrent acquisition strategy is only approved by the DAB when the advantages outweigh the risk.

The CHAIRMAN. Mrs. Lloyd.

Mrs. LLOYD. Thank you very much, Mr. Chairman. I appreciate you gentlemen being with us today. Obviously, we rely heavily on the decisions that you make and the accuracy of your review process.

I would like to refer you to the GAO study of July of last year and the kind of weapons testing quality of the DOD Operational Testing and Reporting. I am sure you are familiar with this report?

Mr. KRINGS. Yes.

Mrs. LLOYD. We did find significant problems and limitations and, obviously, we've gone over some of these shortcomings today as well as the financial constraints—and some of these things, of course, are unavoidable, as you said, due to time and other constraints. The report also stated that OT&E has tended to yield more favorable assessments that are likely to be found where the weapons are employed in combat which can lead to the funding of weapon systems whose operational effectiveness and suitability have not been demonstrated. They also went on to say that we often get reports that contain incomplete or inaccurate statements.

Would you like to reflect on this report?

Mr. KRINGS. Yes, without going into the depth with which we have responded to that before, our general consensus is that——

Mrs. LLOYD. I just wanted you to reflect on this criticism.

Mr. KRINGS. Yes. I think that in most cases that were suggested in that report, the ultimate user, when visiting the ultimate user, he felt that our assessments of the quality and capability of the weapon systems did not exceed what the ultimate user found it to be, number one.

Number two, we found that the Congress has made most of their judgments in terms of agreeing with and funding these systems based very much on what our reports were. We haven't gotten a lot of criticism from those who have made the budgetary judgments that our reports were inadequate.

Mrs. LLOYD. Are you saying the GAO is wrong in this assessment?

Mr. KRINGS. We don't agree with their assessment; that's correct.

Mrs. LLOYD. Would you like to comment on that, Mr. Adolph?

Mr. ADOLPH. Of course, the assessment was aimed primarily at operational assessments. But I concur with Mr. Krings. Obviously, no test is complete in the sense that it doesn't totally replicate a small scale war. So there are some limitations and there are some constraints on any test activity. There are safety constraints; constraints—as I mentioned previously on the availability of actual threats. So there are a number of constraints and there are a number of judgments that must be made.

Mrs. LLOYD. This is pretty strong language, that you issue inaccurate reports to the Congress—inaccurate statements.

Mr. KRINGS. Yes, I know it is. I don't agree with it. I don't think we do render inaccurate—incomplete is a matter of obviously completeness. We will probably never do a complete one because we don't do a——

Mrs. LLOYD. Would you relate this to the General Accounting Office?

Mr. KRINGS. Oh, yes.

Mrs. LLOYD. Is this an ongoing assessment? Would they make another report or will you review this with the General Accounting Office?

Mr. KRINGS. We have quite a few GAO ongoing assessments. I'm not certain whether any of those contain a continuation of those assessments. Those particular programs that they assessed, I think at least one of them is still ongoing, so it is very possible and welcome if they want to look at the programs that are still going on to do that, yes.

Mrs. LLOYD. Thank you very much, Mr. Chairman.

The CHAIRMAN. Mr. Bustamante.

Mr. BUSTAMANTE. Thank you, Mr. Chairman.

Dr. Duncan, I know that the chairman asked a series of questions in reference to concurrency.

Why is there a need for concurrency?

I heard during the last 5 years we have made use of it a lot more than the past. Before that, when were the concurrency programs used?

Dr. DUNCAN. Were you addressing that to me, sir?

Mr. BUSTAMANTE. Yes.

Dr. DUNCAN. My first personal awareness of a concurrent program was a highly successful program—well, two programs.

Mr. BUSTAMANTE. When?

Dr. DUNCAN. In the 1960s—one was the Minuteman program, the first Minuteman program; and the second was the Polaris program. These were concurrent programs. They were concurrent because of the great national need. They were accelerated enormously as a result of Sputnik. I think they were both highly successful programs.

Mr. BUSTAMANTE. That was because President Kennedy at the time wanted to have a successful space program?

Dr. DUNCAN. Yes.

Mr. BUSTAMANTE. Now what is the urgency for concurrency programs during the last 5 years?

Dr. DUNCAN. Most of our highly concurrent programs relate to classified needs.

Mr. BUSTAMANTE. I understand that.

Dr. DUNCAN. I would say that——

Mr. BUSTAMANTE. Let me interrupt you. Let's not go into that. Let me say, what are concurrency programs that are not classified?

Dr. DUNCAN. What are concurrency programs that are not classified?

Mr. BUSTAMANTE. Right, that are ongoing at this time, or that are finished.

Dr. DUNCAN. As Mr. Krings indicated, I would say a very high percentage have some degree of concurrency, and very few of them——

Mr. BUSTAMANTE. Can you name one or two of them that are public, they're not classified?

Dr. Duncan. I would say there is concurrency in the AMRAAM program.

Mr. Bustamante. OK.

Dr. Duncan. There's concurrency in the Trident program and the D5 program, to name a couple.

Mr. Bustamante. Those are two of them.

Dr. Duncan. Yes.

Mr. Bustamante. Somebody was saying, we're going to the development part of test and evaluation; am I correct? You go about 80 percent into them before you test and evaluate; is that correct or am I wrong on that?

Dr. Duncan. The figure that Mr. Krings showed as part of his testimony indicated that a program which is considered to be fully concurrent was about 80 percent.

Mr. Krings. I might interrupt that that's not without a lot of test and evaluation. I specifically was calling that point when the first full-up operational test is done.

Mr. Bustamante. At about 80 percent?

Mr. Krings. In that particular type of a program, that's correct. But that doesn't mean that there wasn't a lot of testing that was done before that—it's the character of the test.

Mr. Bustamante. Mr. Chairman, I'm really concerned in reference to once a program gets to about 80 percent complete, then we have all kinds of problems dealing with it. I'm not questioning your expertise in some of these areas or the DAB, as you call it. What is that? Development Acquisition Board?

Who makes up that Board?

Dr. Duncan. The Chairman is the Under Secretary of Defense for Acquisition, Dr. Costello. The Vice Chairman is the Vice Chairman of the Joint Chiefs of Staff, General Herres. Other members are the Assistant Secretary of Defense for Program Analysis and Evaluation; the Department of Defense Comptroller, myself, the Assistant Secretary of Defense for C^{3}I, the Assistant Secretary of Defense for Production and Logistics; the Honorable Mr. Krings, the three Service Acquisition Executives——

Mr. Bustamante. You have about 10 or 11 board members?

Dr. Duncan. More than that. I have about four more to mention.

Mr. Bustamante. OK.

Dr. Duncan. The three Service Acquisition Executives, the Under Secretary of the Navy, the Under Secretary of the Army, and in the case of the Air Force, the Service Acquisition Executive is the Assistant Secretary for Acquisition. Then we have the Principal Deputy Under Secretary of Defense for Acquisition and the Assistant Secretary of Defense for Force, Management and Personnel.

Mr. Bustamante. So this is the group that makes up——

Dr. Duncan. This is the DAB. The DAB is not a voting body, the DAB is a body in which concerns are raised and then discussed, but ultimately the decision rests with the Chairman.

Mr. Bustamante. In a lot of these programs is there some independent evaluation of these programs—like the Director of Test and Evaluation, does that office come in, Mr. Krings?

Mr. Krings. At the DAB?

Mr. **Bustamante**. No. Once a program is ongoing, the Congress established the independent Office for Evaluation and Testing. What percentage of the time are we using that office?

Mr. **Krings**. We are involved at this point in time in the program throughout the life of the program.

Mr. **Bustamante**. So it's not only the—that article that Mrs. Lloyd was referring to that looks at these programs, but the independent office comes into play?

Mr. **Krings**. Yes. We oversee the activity that's being done by the services and all the testing. I might add, since you referred to that GAO report, we would be glad to send you—it's completed and our answer from the Department of Defense and ourselves is completed and we would be more than glad to send you the whole answer.

Mr. **Bustamante**. I appreciate that.

Mr. Chairman, thank you. I have a series of questions that I would like to submit for the record and have answered, if I may.

The **Chairman**. That's fine, why don't you do that.

[The questions were submitted to be answered for the record:]

HEARING ON WEAPON SYSTEMS TESTING AND PRODUCTION DECISION-MAKING

Mr. Bustamante. Mr. O'Bryon, how much funding is allocated this year for Live Fire Testing activities? How much did you originally request from the Department of Defense?

Mr. O'Bryon. For the current Fiscal Year (FY89), $21.7 million has been allocated to the Office of Live Fire Testing (LFT) for the conduct of those activities under its charter. These monies are contained in two Program Elements (PE), 65131D, Live Fire Testing, and a portion of 65804D, Test and Evaluation. This, however, is not the total funding of all Live Fire Testing activities. The legislation amending Title 10 USC and requiring LFT states "the costs of all tests required... shall be paid from funds available for the system being tested." Therefore, the remaining funds allocated will be found within the Service PEs for those systems identified as LFT candidates and not controlled by the LFT Office. The original budget request, within OSD, for the LFT Office was $17.7 million. This was increased to the figure cited above through an internal, below threshold, reprogramming action.

Mr. Bustamante. Mr. O'Bryon, last year I offered an amendment adopted in the DoD Authorization which would give the Secretary of Defense the authority to re-program up to a third of a percent from weapons procurement for Live Fire Testing. Has the Secretary exercised his authority? If yes, tell us in what instances. If not, explain why not.

Mr. O'Bryon. Last year you offered an amendment in the DoD Authorization to allow the Secretary of Defense to conduct Live Fire Testing and to evaluate such testing using appropriation available for procurement of the systems being tested. The Senate amendment, however, contained no similar provision. The House receded but the conferees agreed with the intent of your provision to allow the Secretary of Defense to re-program up to one third of one percent of the total funds approved by the Congress for the procurement of a specific system that has been identified as a Live Fire Testing candidate, for the purpose of conducting necessary vulnerability/lethality Live Fire tests and evaluations. This discretionary authority has been provided to the Secretary of Defense through a Statement of Managers. Although to date this authority has not been exercised, both the Army and Air Force indicated, within the last month, that it will be used.

QUESTION: What is the basis for the confidence for the information you are receiving as Directors of Research and Testing Activities?

ANSWER: Confidence for the information received by both the Director, Operational Test and Evaluation (DOT&E) and the Deputy Director, Defense Research and Engineering, Test and Evaluation (DDDRE(T&E)) is heavily dependent upon the experience and expertise of their respective staffs. Sources of information used by the staffs include, but are not limited to: the TEMP and associated detailed test planning documents; the Service's staff, program offices, and operational test agencies; contractors; and visits to program offices, test sites, and contractors to gain first-hand insights into the system performance, costs, schedule, availability and test results, including the witnessing and observation of test conduct. The staffs use this information to perform independent analyses and evaluations for their respective Directors. Using their own personal experience, the Directors continuously challenge their staffs to ensure that adequate, quantifiable data were used and are available to support their assessments. In summary, the basis for confidence in test assessments is experienced people and their direct knowledge of system test results.

QUESTION: Is there an adversary process? Is there any challenge to continuing a weapon system development from high level uniformed personnel?

ANSWER: A process of checks and balances is institutionalized in the uniformed services in a variety of ways. Probably the best and most visible example is the Vice Chairman of the Joint Chiefs of Staff(VCJCS). The VCJCS, a four-star general, is not only the chairman of the Joint Requirements Oversight Council (JROC) but also the vice chairman of the Defense Acquisition Board (DAB). As chairman of the JROC, the VCJCS scrutinizes and validates military requirements, placing emphasis on joint service solutions. As vice chairman of the DAB, the VJCS assists the Defense Acquisition Executive (DAE) is reviewing major weapons systems at significant milestones in their development. In both roles, the VJCS challenges military requirements and serves as an impartial joint advisor to the DAE. In addition, a uniformed adversary process exists in the Service operational test and evaluation organizations which operate independent of the program office.

Within the Office of the Under Secretary of Defense (Acquisition), the Deputy Director, Defense Research and Engineering (Test and Evaluation) plays a strong adversarial role in the acquisition process. The process begins during the approval cycle for the Test and Evaluation Master Plan (TEMP) authored by the Services and approved by both the DOT&E and the DDDRE(T&E). These two officials also perform major T&E reviews of each major program as it proceeds through the DAB milestone circuit. The DOT&E is a DAB member. The DT&E position is represented by the DDDRE(T&E). Within the OSD and USD(A) hierarchy, there are no military personnel above the grade of Colonel or Captain in the T&E staffs. There are however, as advocated in the question's background, several prominent high level civilians. Counter to the background's claim however, a manning policy of selecting only civilians for key positions could [illegible] to strong "citizen" advocates, but not the "soldier's" advoca [illegible] discussed in the previous question's background. The best [illegible] ion is the one used today: a balanced staff of experienced ci [illegible] s and military officers of similar grades. The military members [illegible] OSD T&E staffs are as concerned with expenditures of tax dolla [illegible] their civilian office mates, are dedicated to the objectives of their office, and have proven they can not be adversely influenced by any high level uniformed personnel.

It is appropriate that the staffs of both the development and operational test offices in OSD include personnel with operational military experience. Active duty military personnel do provide a prime source of qualified people who have an understanding of military operations.

QUESTION: (a) How do the R&E, DT&E and OT&E communities determine the pass/fail criteria for weapons systems? (b) Is it true that more expensive weapon systems are not thoroughly "Live Fire" tested?

ANSWER: (a) The criteria for weapon systems evaluations are founded in the Service requirements documents, mission need statement, and similar sources. The evaluation criteria used in DoD testing are standards by which achievement of required technical and operational effectiveness/suitability characteristics, or resolution of technical or operational issues, may be evaluated. The criteria are expressed in the TEMP as Required Technical Characteristics and Required Operational Characteristics The Required Technical Characteristics are quantitative system performance parameters, approved by the DoD Component, that are selected as primary indicators of technical achievement of engineering thresholds. The Required Operational Characteristics are qualitative and quantitative system parameters approved by the user that are primary indicators of a system's capability to accomplish its mission (operational effectiveness) and to be supported (operational suitability).

The DT&E criteria are expressed as thresholds and goals for performance evaluations. They are developed during the TEMP-writing process and are amplified by the Services in their more detailed test plans. The objective of these criteria is to obtain verifiable evidence of system maturity and readiness to proceed into the next developmental phase or into dedicated OT&E.

The OT&E community does not "pass" or "fail" weapons systems, but attempts to answer the question "Is the system effective and suitable for combat?" Although specific criteria may be established for many of the elements of weapons system performance, achieving those criteria does not necessarily assure that the system is effective and suitable. That is, an air defense system may achieve its required probability of kill yet still not provide adequate defense. The converse is also true in that a system may not achieve all its criteria, such as call completion rate for a communications system, yet still be operationally effective in meeting communications requirements. This is not to say that criteria are not important. They are used in determining effectiveness and suitability, but the professional judgment of the user and the operational tester also plays an important role in evaluating test results and for measures of performance that have no criteria, professional judgment is the primary factor in determining if those measures are satisfactory. The answers to the questions of operational effectiveness and suitability and the results of the operational tests are provided to the weapons acquisition decision forums and provide one of the inputs to the acquisition decision. The concept of "pass or "fail" is probably most closely approximated by the decision of whether or not to procure and the constraints placed on that procurement. However, it is important to remember that the acquisition decision is also factors as mentioned above.

(Continued) (b) Live Fire Testing (LFT) is not a pure pass/fail exercise. Its purpose is to gain first-order insights into design deficiencies relating to a weapon's vulnerability or lethality, in its combat-configured configuration, so that corrections deemed necessary can be made. Many criteria relating to overall vulnerability or lethality, although important, are not quantified. Hence, isolating LFT to only those parameters which can be quantified would be falling far short of the Congressional intent.

If one looks at the "more expensive weapons" from the standpoint of total procurement dollars, these systems are tested as thoroughly as those having a smaller total acquisition bill. The Statement of

Managers within the Conference Report of the FY 88/89 Authorization recognizes the need to couple LFT investment with its impact on system acquisition dollars: the more expensive the system, the higher the authorization requirement to re-program funds to address LFT issues. If the term "more expensive weapons" relates to the cost per item, one is then typically faced with large ship-type platforms, with total procurement in the dozens rather than in the hundreds or thousands as in many other weapons programs. In these cases, it would not be cost-effective to perform LFT which would catastrophically destroy or severely damage the target. However, we have made proposals for ship testing which involves some testing on an entire ship to gather those data which would affect an entire ship (i.e., shock, whipping, toxic fume spread, crew acceleration). These tests would be coupled with tests against a combination of surrogate ships, ship cross-sections and, for those damage effects which can be scaled, through the use of scale ship models.

The key to testing these more expensive weapons is to assure that the portion of the target affected by the attack is fully representative of the actual target including operational electronics, fuel and hydraulic systems, ventilation and fire control systems and crew mannequins. This is consistent with the Congressional intent which states that "if the Secretary of Defense, prior to the system or program entering full-scale engineering development, certifies to Congress that Live Fire Testing of such system or program would be unreasonably expensive or impractical, the Secretary shall include with any such certification a report explaining how the Secretary plans to evaluate the survivability or the lethality of the system or program and assessing possible alternatives to realistic survivability testing of the full system or program."

QUESTION: What are the limits to inclusion of contractor personnel or "golden teams" of personnel prepared or trained in advance of an operational test?

ANSWER: The limits on participation of contractor personnel are as contained in current law. System-contractor personnel may be involved in an operational test only to the extent that is planned for them to be involved in the operation, maintenance, and other support of the system being tested when that system is deployed in combat. For the final operational test to support a beyond-LRIP decision, contractor personnel do not participate in the operation or maintenance of the weapons system under test, unless the deployment concept for that system calls for contractor involvement.

Personnel or crews who conduct operational tests are not specially selected to guarantee the success of the weapon system. Some selection may be employed to ensure that operational and maintenance personnel are sufficiently experienced to identify system deficiencies. For the most part operational test personnel are fleet average. Through the process of involvement in development testing, or due to an extensive operational testing period, personnel or crews may develop more immediate experience on a system than an average crew. However, this is more than offset by the lack of a mature training pipeline and the lack of senior personnel who may have several years experience on a system once it is fielded. Also the operational test crews must usually work around deficiencies found during testing, use procedures which are not fully mature and develop the tactics as they proceed through the test. These extra demands more than counter the additional experience crews may have or develop during the testing process.

QUESTION: By what method does the DoD and the Services ascertain the test method that would best emulate combat?

ANSWER: The operational tester attempts to emulate the combat environment by replicating the threat forces as described by the intelligence community and attempting to carry out the weapon system's mission against that threat using the tactics and operations described by the user. In those cases where the threat can incorporate a man-in-the-loop factor, the men will try to defeat the weapon system. The threat that a system must counter includes the threat systems of all the enemy forces.

QUESTION: Is it not true that by the time a billion dollars has been spent, a weapon system has acquired a "life" of its own and is very hard to terminate even given marginal performance?

ANSWER: Actually, a weapon systems may acquire a life of its own much earlier in its life cycle because substantial investments of time and money are made at the very earliest phases of a major acquisition program. However, it does not invalidate scrutiny requirements during operational testing. Constitutencies develop within both the executive and legislative branches as well as within industry. This phenomenon, however, does not invalidate the scrutiny that is applied to a program through the milestone and legislative review processes. Indeed, these processes exist in large part to ensure that despite various institutional biases major programs are rigorously evaluated at critical junctures.

QUESTION: Is it not true that bureaucratic pride is such that there is strong pressure to define a system as a success independent of test results or to change specifications to match outcomes?

ANSWER: We do find that tendency exists in some quarters as illustrated by an April 6, 1989 letter to Secretary Cheney, which was signed by twenty one (21) Members of Congress. That letter concerned the Improved Recovery Vehicle (IRV) for the Army. It stated in part: "The competitively selected IRV can do the job and problems revealed during earlier testing have been solved and are currently undergoing validation testing." Those Members are apparently defining the IRV system as a success; although their judgment does not coincide with that of the Department. The letter went on to say: "Therefore, we urge you to ensure that every possible measure is taken to move ahead with the IRV program." This effort to urge the Department to move ahead with a program, which has not proven itself in operational testing, may be indicative of the bureaucratic pride referenced in the question.

Mr. Bustamante. Mr. Krings, when and where, if at all, is it advisable to delete test sequences from an approved test program?

Mr. Krings. The approved operational test program for a given weapon system is as outlined in the Test and Evaluation Master Plan and Operational Test Plan.

Testing is a dynamic process providing information concerning system strengths and weaknesses. Test planning must also be a dynamic process being continually updated to provide the maximum amount of information to reduce risk within limited resource and schedule constraints. A test program is developed with an expected success rate in meeting test objectives. If the success rate is greater than expected then test objectives can be met with fewer tests and the expense of the additional testing can be avoided. The TRIDENT II (D-5) pad launch program and Peacekeeper OT&E program are good examples of this. Conversely, if the test success rate is less than expected, not all test objectives will be completed and additional testing and RDT&E funds may be required.

With regard to the combination of development testing and operational testing, resources can be saved when both development and operational test objectives can be met during the same test event. This is not a function of test progress but would be addressed in the early planning of the test program. Such combination of development test and operational test objectives is only permitted if the credibility of the operational test results is not affected.

QUESTION: How does a Director for DT&E or OT&E know what to test for in a design on behalf of the various decision-makers?

ANSWER: The Directors for DT&E and OT&E review the test designs to ensure they reflect appropriate threat system capabilities and tactics. It is the evolving threat that drives the changes in military requirements in the first place. These capabilities and tactics are estimated by the intelligence community and replicated to the extent permitted by safety and resource constraints. The Directors gain their knowledge from test experience and direct involvement with the decision makers in OSD and the Services. The needs of the decision-makers must also be considered. For example, Milestone I and II decisions are driven by "can it work?" At this point, DT&E assessments and Early Operational Assessments are presented to the decision-makers. Later, when Milestone III decisions are being made, the OT&E assessments play a strong role in the deliberations.

Mr. Bustamante. Mr. Krings, what is the value of collecting and supplying all data from all OT&E for the decision makers?

Mr. Krings. We would agree with the implied thrust of this question that all valid test data should be considered in evaluations of weapon systems. However, it is questionable whether top level decision-makers would have either the availability of time, or the broad and in-depth technical and operational expertise to digest and interpret ALL data from ALL operational testing. It is important for the tester to understand and record all relevant data. That data is analyzed at various levels of aggregation on the test ranges, within test agencies, within the Service staffs, and within the OSD staffs; to provide a composite assessment of a system to the decision-makers. After monitoring some of the testing and reviewing/analyzing the reports of the test agencies, DOT&E provides an independent assessment as to 1) whether the OT&E was adequate, and 2) whether OT&E results confirm that the items or components actually tested are effective and suitable for combat.

The operational test community provides its best judgment of operational effectiveness and suitability and sufficient test result information to support that judgment. The Director, OT&E makes an independent judgments on what data to include or exclude on those programs for which he has oversight and his overall results and assessment may be different than that of the service test agency. These individual judgment to include or exclude data would not normally be provided to the acquisition decision makers unless they were critical to the overall assessment of effectiveness and suitability. Should any decision maker require access to ALL data from ALL OT&E, it could certainly be provided. However, distillation and interpretation of all that data by senior decision-makers is normally not suggested by DOT&E. The basis for each OT&E assessment is included in an appropriate detail level; but complete voluminous details of all evaluations and assessments are not routinely included in DOT&E reports to higher decision levels. However, such detail is made available when desired on a case by case basis.

QUESTION: How does the Director of a System R&D program, or the Director of DT&E or OT&E know when to recommend continuing development of a new system design or when to recommend the system be terminated?

ANSWER: The Director of DT&E knows when to recommend continuance or termination from field reports, staff visits, and analysis. From a developmental viewpoint however, the decision is more frequently one of when are requirements adequately met, or is further development necessary? Rarely are test results the sole driver for cancellation. More normally, it is a broader set of factors such as cost, schedule, or a major inability to counter the threat with the current design approach.

The Director, Operational Test and Evaluation reports on system capability as demonstrated in actual testing as well as his independent operationally oriented assessment of the potential effectiveness and suitability prior to completion of operational testing. While DOT&E reports, to the Congress, reflect his judgment concerning system capability; his charter does not include making specific recommendation concerning system termination. He does, of course, make recommendations to USD(A) and the Secretary of Defense in their considerations of such factors as test results, schedule, national need, competing priorities and requirements, and the myriad of other considerations which would influence a Department decision to terminate a program. The DOT&E recommendations are based upon careful review of the system requirements, balanced against the progress being made toward attaining those requirements.

QUESTION: How many times, aside from the DIVAD which was an obvious failure, has a sponsoring Service on its own, with no inducement from Congress, canceled a weapons system program for poor performance after it reached a hardware stage? Have you terminated contracts for default and have you asked for your money back?

ANSWER: Based on OSD records, the DIVAD is the only example where a Service on its own, has canceled a program for poor performance after reaching the hardware stage. Others have been canceled after building hardware, but the Services were not the sole decidor of the action. As for termination of contracts, it is assumed that the "contracts" referred to are ones which represent production of a weapon system which has benefited from early development contracts. At the present time, there are no known production contracts being terminated for default.

Mr. Bustamante. Mr. Krings, does your office feel pressure to NOT find fault with major systems during OT&E?

Mr. Krings. ABSOLUTELY! Disagreements often rises. And it is often very lively. Given the wide variety of test parameters and program interests, as the independent evaluator, we are often pressured by the Services, DoD and the Congress. On the other hand, if pressure is meant to be "a compelling or oppressive influence" there is no one who can compel DOT&E to change our answers, the law is very clear on that, and that ensures our independence.

QUESTION: In any large corporation there is a man or office responsible for deciding what to buy, another different individual for placing the order, a third individual to receive the material and certify it meets the specifications, and yet another individual to pay the bills after receiving certification that the order was properly filled. It appears that in the Services all of these functions are performed by the same office. Should this be changed?

ANSWER: In the Services, these functions are performed by different divisions, and not by the "same office". For example, the various operational units (in aggregate, referred to as the "user") are the originator of military requirements or deciding "what to buy". These requirements are ultimately validated by the Joint Requirements Oversight Council before a new program is actually initiated. Once a program is initiated, the contracting officer, located in the separate buying commands, places the orders for materials and services. Formal governmental acceptance of materials is performed by the Administrative Contracting Officer, usually located in the contract administration office or plant representative office. The bills for accepted materials are paid by the Comptroller organizations.

QUESTION: It is the perception, faulty or not, that systems testing, both developmental and operational is not sufficiently rigorous. If the equipment being tested came from external sources (e.g., Britain, France, or an independent DoD agency) would the testing be more rigorous?

ANSWER: The nominal test situation does not replicate the totality of a combat environment. In that sense, systems may not be tested as rigorously as they would be in combat. DOT&E approval, or lack of approval of operational testing is not a function of whether a system is desired by a Service. Concerning foreign weapons, there have been a number of operational tests recently that have involved U.S. and foreign systems. We have conducted operational tests of air defense and anti-tank systems using foreign candidates. Such tests have been designed or analyzed around a side-by-side comparison methodology. Such a methodology attempts to remove variations of external conditions in the comparison of test items. Since in both of the cases it was possible to determine the comparative effectiveness of candidates under similar testing conditions, it can be concluded that the test was sufficiently rigorous for its purpose. There is no evidence that foreign equipment is tested more rigorously than U.S. equipment. There is considerable evidence that testing and test facilities in NATO countries are much less sophisticated than in the U.S.

The CHAIRMAN. Just to go back to Mr. Bustamante's question, if you say that the justification is the need to get something into the service and you came up with two very good programs—the Polaris program and the Minuteman program—and those were strategic need, in the strategic program if you have some need and you got a threat, that could clearly be an overwhelming case for more concurrency. What about tactical programs now with Mr. Gorbachev. It would seem to me that looking at the Soviet Union now you would say that the threat of an attack from the Soviets is less in the short run, but you don't know what's going to happen in the long run. Maybe Mr. Gorbachev won't survive, maybe he won't succeed; so, the threat would probably be more in the long run than in the short run.

Has that been reflected in less concurrency in programs now than there were, say, in sort of the 1979, 1980, 1981 time frame where there was a real perception that the military balance was not good and that we needed to play some very serious increased funding and catchup?

If that was the reason, it would show up, that you would have more concurrency in the 1980-1981 period than you do now in the 1988-1989 period. But Jack Krings says concurrency is probably a little higher now than it was. Why is that?

Dr. DUNCAN. Were you directing that to me, Mr. Chairman?

The CHAIRMAN. Anybody.

Dr. DUNCAN. Let me make a comment and then perhaps the others could also comment on it.

The programs that were started in the period you're talking about, the early 1980s, are now the programs that are making the headlines. They are major programs that came about as a result of need. So there is concurrency there.

In terms of the new programs, the programs that are new starts, you might say, that are now occurring, I don't know that we can say there's more concurrency among those than there is——

The CHAIRMAN. I thought that was what Jack Krings was saying was the——

Dr. DUNCAN. My interpretation of what Mr. Krings was talking about was the total menu of programs that we have on our plate, most of which were started in that time frame that you're talking about in the early 1980s, late 1970s, and so forth.

Is that not correct, Jack?

Mr. KRINGS. Yes.

The CHAIRMAN. Let me just ask this question, and there's got to be some statistical evidence to show it one way or the other. The programs starting now are less concurrent than the programs starting in the early part of this decade? Be careful, Jack, because I don't think that it's true. I think that the programs starting now are at least as current and maybe even higher, than they were in the 1980-1981 period.

Mr. KRINGS. The expression that I made before, I really did qualify an impression, because I don't know the statistics. I really, honestly don't know the statistics. But I know when we looked a couple of years ago at the general overall budget of new acquisitions at that point in time, the concurrency level was growing.

Now, response to other activities, et cetera, again, we are in the testing enforcement business, not the justification for a concurrency existence.

The CHAIRMAN. I understand. Let me just make the point and then we will move on to somebody else's questions because I don't want to hog all the time.

It seems to me that what I've heard this morning is that the main and most valid justification for a high degree of concurrency is the need for the weapon systems in the defense inventory. You need it early, you can't wait, you have to get it.

I think that most people would believe that if it were not for that pressure of time to try and get it into the forces early for good and sufficient defense reasons, that prudence, history and other kinds of reasons would say, be careful, and don't make it a concurrent program, make it the traditional program that you've got on this chart, and that's the prudent thing to do.

The only reason for doing it that I can hear that makes sense to me is that you need it in the military inventory, because there's a need out there and it has got to be filled in a hurry. So it seems to me that one impact that Mr. Gorbachev ought to have on that is if we were operating under that premise, one big change you ought to see is you ought to see an awful lot of programs that are now in the traditional funding cycle—35 percent of the funds before you have the operational test, and a lot fewer programs, and in fact, none, in the 80 percent category.

My view is that if we see any movement at all—and probably we don't see much movement at all—but my feeling on this is we probably see a move toward more concurrency rather than less when you ought to see dramatically less concurrency given the international situation.

Mr. Sisisky.

Mr. SISISKY. I think you asked most of the questions on concurrency.

I met you gentlemen at another—that I can't talk about here so if I get off base, put me down, I don't mind you doing it.

Mr. Chairman, there's a lot of concern, not only with concurrency but low rate versus high-rate production. I am really concerned, as I look at the charts of your operational tests—successful operational tests—about going into high-rate production. You know what I'm talking about when I say I'm worried about how do you make that decision.

But more important, how do you really establish the total quantity for low rate initial production? What criteria do you use? What checks and balances exist to preclude running the total program on the LRP (low rate production) and the "I" is initial—and I think these are important bases—and thereby really evading additional program reviews and test milestones that are tied to full-rate production?

I think that you gentlemen right there, and the DAB, can do more to solve our financial problem in the Department of Defense than anybody else. Because I worry about—as you know, I expressed my reservation about costs plus and other things that we don't get full-rate production; if we're doing concurrency or doing it too fast, then it gets pretty difficult to do the bids properly.

I have thrown enough out to you, now you can answer me.

Mr. KRINGS. The determination of what is reasonable for low-rate initial production I think, again, is coming under a much stronger discipline than it was in the past. We require now in the Test and Evaluation Master Plan that both Pete and Bob, or Cliff, alluded to, we require in there that low-rate initial production is identified—now, this is early in the ball game, early in the program—as opposed to determining later on if it's low-rate initial production.

That's part of the so-called contract between the service and OSD, to ensure that low-rate initial production is identified and it isn't a case of just staying in the low rate forever and never having to go through the big check. That's obviously one way you could avoid it.

So now we do emphasize——

Mr. SISISKY. We do have that, by the way, do we not?

Mr. KRINGS. Pardon?

Mr. SISISKY. Do we have some programs that keep using that low rate without getting all of those——

Mr. KRINGS. There have been some in the past. There have been some that attempted to do that, but there haven't been any recently successfully doing that. Because we emphasize, as you did, the other word in there which is "initial" because in some people's eyes nothing gets to high-rate production, thanks to some of the generosity. It never really gets to high rate; it stays in low rate forever, not because it's called low rate.

The other operative word in there, "initial," is that initial production is made primarily to produce items that are production manufactured for operational testing. That is one of the primary reasons for low-rate initial production. Other reasons would be obviously to see what the quality of the production line is and to get other items for other functions of testing other than operational testing.

So that we do now, very early in the program—and, again, this DAB process is bringing that sort of discipline—so that early in the life of the program the program manager or the advocate must at the DAB—the Service Acquisition Executive—must at the DAB defend the acquisition strategy which includes the definition of LRIP. So it doesn't go on undefended or unargued, as it may have in the past.

Mr. SISISKY. Of course, that's fine.

How do you really define "low rate" though? What are we talking about? As a general rule, are we talking about 20 percent, 22 percent, 25 percent?

Mr. KRINGS. It has to be tailored to each one, because if you're only buying a few very large ticket items, it has a totally different context than if you're buying a million gas masks. It has to be tailored. Plus the time that it takes to build the product itself has to be taken into consideration. In a submarine that takes 5 years, or 4 years to build a submarine, it's quite a different animal.

So what we try to look at is that the product of the low-rate production should first and foremost produce enough articles to do operational testing so that we can make a decision to go to full-rate production, number one.

Number two, it should produce—it is economically unreasonable to produce them at such a rate you're going to shut the factory down and start it up again; then the cost gets exorbitant, so there has to be a balance between the two.

Mr. SISISKY. See, you know what bothers me, going into high rate at the full testing and you'll do it concurrently.

Mr. KRINGS. No question.

Mr. SISISKY. That is a waste of money, particularly—and I look at Mr. Adolph and all of you—the primary fact it would justify proceeding with a highly concurrent program is the urgency of a military requirement—and when you've been working with something since 1975 and overnight it becomes a military justification for having to do it. You can justify anything if you had to do that.

I really worry about us justifying and speeding programs that really shouldn't be speeded. That's where I say you gentlemen can absolutely do more to this defense budget than perhaps anything that could happen--both in the Congress and the Department of Defense, or anything else—by being very careful and being very specific in your testing. I just worry about going ahead with programs that we have no business going ahead because the cost will be unbelievable to us.

Mr. KRINGS. I might add, though, that in a parallel effort we should learn to do concurrency better because traditional programs are expensive also. So I'm not saying concurrency is good or bad—it's just a tool, and it should be used. But when we have a program that has a problem, or we don't have an urgency, or there isn't a lot of money to be saved, it's foolish to do concurrency.

Mr. SISISKY. Would the same criteria apply to non-Defense Acquisition Board programs that you did here, and——

Mr. KRINGS. The non-DAB programs, the services make their decisions on, my office is involved in some of those, depending on the size of the project, but not all of them. Obviously, it's a huge number.

Mr. SISISKY. I mean such as maybe special aircraft or something, without mentioning what.

Mr. KRINGS. Oh, yes.

Mr. SISISKY. Services use the same criteria for that?

Mr. KRINGS. That's right. In the programs that we are involved in, we are involved in a lot of classified programs as well, we try to use the same criteria. But, again, you get back in the case or urgency, the service, the Under Secretary for Acquisition, and the Secretary would be the ones who would decide the degree of currency; again, we just apply the rules to it. But there are concurrent classified programs and there are traditional classified programs.

The fact that it's classified doesn't necessarily dictate that it is concurrent.

Mr. SISISKY. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Ray.

Mr. RAY. No questions, Mr. Chairman, thank you.

The CHAIRMAN. Pete.

Mr. SCRIVNER. I'd like to pick up on, without running it into the ground, this issue of concurrency again.

As I recall, one of the major recommendations of the Packard Commission was that perhaps we ought to slow things down a little bit, and that we ought to be pretty careful in terms of the development activity and make certain that we know where we're really going.

As a result of that, has DOD established any kind of a standard definition of concurrency or established a set of criteria by which to evaluate the risks associated with concurrency?

Dr. DUNCAN. To my knowledge, we do not have a formal definition of concurrency. The closest to it is what Mr. Krings has described as it means you're doing things simultaneously, like designing, developing and building. A degree of overlap in some cases doesn't exist, but that's a very unusual case. There seems to be, in most cases, some degree of overlap. How much overlap before you call it a concurrent program is not specifically defined.

Mr. SCRIVNER. This suggests, then, there has to be some sort of risk analysis or risk assessment. Do we have that process in place now? If so, who engages in the assessment?

Dr. DUNCAN. This is a testing community primarily. Do you want to talk to that?

We have as part of the Milestone meetings in the DAB risk assessment and reports on the status of the development testing, and it's one of the higher Milestone meetings, the operational testing. We have that report. We consider the successes and we consider the failures and we judge the risks therefrom in making a recommendation to the Under Secretary of Defense for Acquisition as to whether or not he should proceed into the next phase.

I'd like to comment on, if I could, one thing that I have observed—this is a personal observation—since the Goldwater-Nichols Act, which created the Under Secretary of Defense for Acquisition and which created the process that we're now implementing, it is still evolving. But one thing that is happening is that more and more it's becoming an event-driven operation, which means the decision process itself that goes on in the DAB is pushing away from concurrency, as I view it personally.

The problem that we have with working on an event-driven basis, and then budgeting on a calendar basis, is that there's a disconnect. The disconnect has to be faced up by the program manager who has to make judgments and guesses about how long it's going to take for him to get to the next event and, therefore, how he is going to do his budgeting. Then that has to go up through the service command and then to the OSD.

In the OSD we try to bring together this disconnect at the Defense Resources Board (DRB), which is chaired by the Secretary of Defense. The Under Secretary of Defense for Acquisition is a member of that Board, I'm a member of it, Mr. Krings is a member of it, and the CINCs attend. We try to resolve any disconnects that we have between the event-driven, the way you look at a program, and the need for intelligent budgetary planning.

Mr. SCRIVNER. Speaking of event-driven programs, you've made some references to the B-2 and, of course, the maturity matrix for the B-2 program was the initiative of this committee. I don't know what kind of reception that actually received in the Department. I do recall that there was some reluctance on the part of some to have this kind of system in place because there was concern that it would be too handy for the Congress as a means of measuring progress with the program.

I would like to just project it on a little bit further and ask whether there would be benefit in taking a system matrix concept and having it incorporated in the actual contracts that are signed between the Department of Defense and the contractor who has been selected to provide a piece of equipment?

Dr. DUNCAN. Mr. Krings, I think you should address that.

Mr. KRINGS. No, I don't think I should address that.

The contractual relationship between the service and the contractor is far from the testing community.

Mr. SCRIVNER. I understand that, but I think Dr. Duncan might be able to tell us a little bit whether——

Mr. KRINGS. Yes, but the first part of your statement about the acceptance, there was some reluctance. But I can assure you there's a lot of enthusiasm at this point in time about maturity matrices on the programs that have been designated. But the contractual thing I'll leave to somebody else.

Dr. DUNCAN. On the maturity matrix, I'm not aware of any great concern about it. The issue of making it part of the contractual process is a good question, a very valid question, and is something that we should seriously consider.

I am not prepared to give a yes or no type of answer at this time because I'd like to hear what the——

Mr. SCRIVNER. I'm not asking for a yes or no necessarily. What I'm asking for is if you would want to include something in the record as to what you would see as the benefits and the drawbacks would help the committee.

Dr. DUNCAN. Yes.

Mr. KRINGS. I might point out, in a program that exists right now in the C-17A program, it is a rather event-based relationship between the service and the contractor—I think you would agree that it is. So it is going in that direction. I don't know what the contractual relationships are directly but there is event-based contractual milestones, if you will, that is not terribly unlike a maturity matrix.

I don't think it's to that degree of sophistication, but there has been some trickle down, if you will, to the contractual versus service relationship—at least in that program.

Mr. SCRIVNER. Thank you, Mr. Chairman.

The CHAIRMAN. Doug.

Mr. NECESSARY. I'd like to follow up on Mr. Sisisky's line of questioning in this relationship between LRIP, low-rate initial production, which somehow seems to evolve into low-rate production, and we may or may not get to what was earlier defined as full-rate. Maybe an example might aid the discussion of understanding the difference between these—perhaps the Phoenix program is an example. We started off with low-rate initial production some years ago for the AM-54C. Somehow the high fell out and it became LRP, just low-rate production. Then we got preoccupied, it seemed, with establishing a second source, also at low-rate production. Now we've got dual sources, LRIP-ing. We have yet to go through the full Milestone 3B test protocol. Yet, I think that we, the Congress, have already committed to more than half the total plan buy.

I guess the question is, following up on Mr. Sisisky's inquiry, is we are told that LRIP ought to include test articles and some quantity to avoid a factory shutdown and restart. If there's other criteria that are appropriate, I think those would be helpful to us.

But what becomes the justification for, say, low-rate production, where the high falls out? It seems to me that LRIP ought to be a fixed and understood and event-driven, and you get through that 3B knot hole with all the tests in good shape or you take some more drastic measures. But on this program now we have two producers at low-rate production; we haven't got through the full-up test yet and we're more than halfway through the program. That's ongoing today as we sit here.

I am following up on Mr. Sisisky's question. Is there a justification for LRP—LRIP I understand, but LRP? Why would it be that we would look at two sources at LRP? What would the justification for that be, given the discussion we've had today?

If whatever criteria the DAB would use to make determinations about concurrency, low rates, and so on, why would they not be suitable criteria for the services to use in the programs that are not DAB programs?

I think maybe my questions are more directed at Dr. Duncan than anyone else—I'm not sure.

Dr. DUNCAN. With respect to the Phoenix as the particular example, which I think is a good example, I'd like to ask Mr. Rumpf, who has been following that program, if he has any comments?

Mr. RUMPF. Mr. Chairman, this program is a bit unique. It has gone through evolutions over time in which there was a production break because of the compromise to the basic missile with the Iranians earlier in its lifetime. That fact, unfortunately, added a series of changes in terms of capability into the system. We also had a contractor whose performance was very unacceptable over a series of years, the Hughes Company, where we actually had to shut down the production line for over a year while we tried to get the reliability of the system up to par.

Unfortunately, or fortunately, I guess I should say, this is not the norm for the bulk of the programs.

While this is a good example of a series of limited-rate production decisions, it is not the norm for other programs. This was a rather unique program in the sense that we added an Engineering Change Proposal (ECP) to the program for counter-countermeasures. We then sealed the missile. We changed the warhead in the process. Ultimately got to the point, that Mr. Necessary has brought to our attention here, that as we fixed on what we hoped to be the final configuration or revised baseline and looked for cost reduction techniques, we chose a competitive second source to initiate that procedure.

That's the history of the program. It's unfortunate——

Mr. SISISKY. Was it done to bypass the operational testing?

Mr. RUMPF. No, sir, there are series of operational tests phases that took place, and a series of developmental tests that have occurred since the 1982 time frame, I have them all listed and would be happy to provide that for the record here. This program has gone through a large amount of testing, and each time has encountered different issues in its capability. As I mentioned, number one, it was first compromised and we had to make some major changes to the system, obviously, to maintain its warfighting capability. The Navy does not have a long-range weapon other than Phoenix and the old Phoenix Missiles (AIM-54As) in the inventory were compromised.

Mr. SISISKY. Excuse me. Did it stay at low-rate production or was it low-rate initial production? Where are we on that?

Mr. RUMPF. If it stayed at low- or limited-rate production, sir, it was no longer initial production at that point in time.

Mr. NECESSARY. That begs the question, I guess, of Dr. Duncan, what is the rationale for low-rate production? I think we spoke earlier to low-rate initial production.

Dr. DUNCAN. I would answer that question by saying we don't want low-rate production. We want to go from low-rate initial production. We want to go through the proper testing and then go into full production. I can't verify this quite here but I think most cases where we stay into low-rate production, there's a lot of extenuating circumstances which kind of drives it in that direction. This is an example of a lot of things that happened that keep you there.

Mr. NECESSARY. My sense is we're just low-rating our way through the program. Not only that, we've made a major decision to do it with two sources, which I find incredible.

I guess now for Mr. Krings, are you satisfied that this has been tested to the degree that would support an approval for full-rate production?

Mr. KRINGS. No, I think that's coming up. We haven't reached that point in the life of the Phoenix.

Mr. NECESSARY. We're over halfway through the program; we have two sources, so we've got to worry about keeping two production lines sufficiently work-loaded, and we still haven't——

Mr. KRINGS. If you're asking for a personal judgment on the acquisition strategy, which is not exactly part of our game but, nevertheless, it's true, yes, there's no question about it. One could certainly question going into two factories for low-rate production in anything, but you would have to really go back and look at the acquisition judgment that was made at that point in time. Certainly that experience is being brought to the table when we decide on future acquisition. At the DAB meetings that I go to, certainly they are looking at these—they are learning from their past performance, yes.

Mr. NECESSARY. I think we have a series of judgments on this program over a five or a 6-year period of time. I'm just trying to get a feel for what is the check or balance that precludes that from happening again. Obviously, none of us would sign up to the Phoenix program that turned out if we were starting with a clean sheet of paper.

What prevents it from happening again?

Mr. KRINGS. The DAB. The mechanism that is currently prevailing in the DAB and the increase in discipline and the increase in questioning in the DAB process that, quite truthfully, did not occur before. There are programs right now in which low-rate initial production has been changed, and subsequent low-rate buys have been changed as a result of this.

I won't say that every single program has been changed but there have been programs that have been altered as a result of the discipline that's being brought to some degree in the DAB process. The C-17 is the first example.

Mr. NECESSARY. The changes in the DAB process, is that the result of people having been together and working together for a while now, or is this something that's institutionalized such that your successors can pick up on it?

Mr. KRINGS. Both. I think it's the fact that the people have worked together and I think that the DAB is institutionalizing things in a much more disciplined way than it was in the past. But I'm not trying to convey the fact that it is perfect by any stretch of the imagination. But it is not going in the wrong direction, which is welcome.

Mr. O'BRYON. Doug, if I could comment for a moment on the 54-C Phoenix. Back in December, the Navy came in with a request to us—in fact, let me clarify something before I go any further. I believe, Dick, if it's true, ALP is the authorization for limited production, not low rate, and it's an annual authorization rather than a chunk that you buy over a couple of years.

When they came in, our analyst looked at the test data to date and it indicated that some of the testing was not complete on one of the three threats, which I will not discuss in open session.

We went back with them indicating that additional testing should be done against this particular scenario before we had any confidence that the missile was indeed what it should be. At that time, I believe 51 percent of the missiles had been purchased. That was in December.

The law for live fire testing and also for Jack Krings' operational testing is tied to a classic III B decision. Right now an ALP or an AFP, which is authorization for a full production, is not really a classic III B decision. This is a situation that I think can be rectified—should be rectified—so that this system, which is on the OSD development T&E oversight list, should go through the classic wicket rather than the way it has been procured.

Mr. SISISKY. How many production rates do we have? We have limited production, LRIP, LRP, full-rate production. How many others do we have? Maybe we need to get an understanding——

Mr. O'BRYON. The ACAT programs, and all sorts of different ones.

Mr. SISISKY. Maybe we had better get a list, Mr. Chairman, before we go through the procurement budget.

Mr. NECESSARY. I'm beginning to think we have as many as required to avoid full production.

The CHAIRMAN. Nora.

Ms. SLATKIN. I would just like to follow up on some comments that each one of you have made and then put it into a real world situation so we can understand some of the trade-offs that you make at the DAB.

You all talked about how you're moving toward more event-driven activities and away from, in the case of you, Mr. Krings, highly concurrent programs; and away from, in the case of you, Mr. Duncan, schedule-driven activities—talking about event-driven activities.

I would like to raise for some discussion, if I may, the Army's multi-subscriber equipment program, which you have just recently released, I guess Option 3 or Option 4, a total $3.1 billion of the program, or about 75 percent of all the money obligated right now—75 percent—so it fits your chart of a concurrent program, Mr. Krings.

In this particular situation, if I may for a moment, we've obligated 75 percent of the dollars on the program. You've just completed an operational test where in fact one of the critical requirements had not been met—the 90 percent call completion rate. In fact, you do not have a definition agreed to with the contractor of how to define and test 90 percent call completion rate.

You say in your report that you consider the operational suitability and effectiveness of the system to be adequate at this level of maturity.

I guess my question is—not disputing the facts there—but my question is:

One, how have we moved to event-driven schedules when in fact we have a situation where 75 percent of the dollars have been obligated? The reason they have been obligated is because we have a contractor-driven schedule. So that's one: How do we say that we're really moving toward event-driven schedules?

Question two is: How does the Government protect its leverage here? We've obligated 75 percent of the dollars. You have some concerns on its operational suitability. We don't have too much more left of the program. It's a capped program—$4.3 billion.

So how does the Government protect its leverage in dealing with the contractor when it has obligated 75 percent of the dollars?

Mr. KRINGS. I think it's in the word "obligated." Clearly, all the money is not spent and it is not irrevocably committed to the contractor by the Army—it is not irrevocably by the Army to the contractor.

There are a significant number of activities that will occur through the life of the execution of the contract that will give many opportunities for the Army to alter the rate at which they buy the product.

At this point in time, having been a non-development item, there was not a full-scale development process per se. So it essentially went right into limited rate production in order to get items to do any testing at all.

In reference to the call completion rate or grade of service, the relationship between the service and the contractor on the methodology of measuring that, we in the operational testing area, were more concerned about the operational capability of the system rather than the contractual obligation between the service and the contractor, which I agree is an area, but I won't say not of concern to us, but not of primary concern to us.

We found, as you have read in our report, that the operational effectiveness of the system when fielded, did meet the user's requirements and, fortunately, subsequently, larger fielding of the system is even meeting the user requirements better.

So it's an argument between the service and the contractor as to how they measure that technical requirement. But clearly, the operational effectiveness was demonstrated at the operational test that was done. Again, I don't believe that 75 percent of the money is irrevocably committed by the service to that contractor, by any stretch of the imagination.

There was an option granted, but there's no guarantee that the next or any subsequent options has to be granted.

Ms. SLATKIN. There's only one option left on the Milestone program.

I guess my question is, obligation, while it's irrevocable—when you obligate funds or commit funds, you can always not expend them, but it shows a level of satisfaction and commitment on the Government's part. You are sending a message to the contractor when you continue to obligate funds and continue to exercise options.

Was that the appropriate action here in light of the fact that we haven't DD–250 or the Government hasn't accepted too much of the equipment; and we still have concerns from your report anyway, Mr. Krings, not just the 90 percent but a whole host of things that haven't been tested.

Is that an event-driven activity here, or are we talking about a contractor's schedule driven activity?

Mr. KRINGS. In our case, the report that we wrote based on the operational test, I think fulfills the step to go into full rate production as opposed to limited rate production for products to do operational test with.

I think you'll find—and I'm sure you know—that the relationship that goes on between the Army and us with respect to future operational testing, as the system grows will have a dramatic effect on the rate of acquisition.

I really believe the contractor is well aware of the fact that he does not have the full production contract executed and is without the requirement to prove that the system continues to operate as it grows and the numbers that are fielded.

Dr. DUNCAN. I would like to see if Gen. Otto Guenther of the Army would——

The CHAIRMAN. General Guenther.

General GUENTHER. Thank you, sir.

Let me add to what Mr. Krings has said. One of the questions that Ms. Slatkin asked was, how do we assure ourselves that we are protecting our interest with regard to the contract. Recognizing that we did have in fact that shortfall, although the testers indicated it was suitable for fielding as well as effective and a much significant improvement, we did take the necessary action through appropriate contract modification to assure ourselves in the future that we are getting the system that we paid for to include the total percentage of grade-of service that we asked for.

We will be conducting a full-up test to include Milestone Reviews leading to that test with the contractor. Testing will be conducted both in the contractor's facility with contractor testing and Government witnessing and full-up field testing in an operational environment.

To assure ourselves that we have the appropriate hooks in the contractor, although not tied to options, we have tied Milestone Reviews to our progress payments. We pay the contractor when he puts the equipment in the field. When he delivers and we sign the

DD-250's accepting the equipment, we pay for that unit as it is put in the field. We also have a warranty in the contract that will require fielded equipment to be retrofitted free of charge based on the fixes that the contractor puts in to get to that grade-of-service level.

Ms. SLATKIN. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Kasich.

Mr. KASICH. Thank you, Mr. Chairman.

I am trying to understand how we did what we did on the TACAMO system. The argument on concurrency basically is you have to produce something because it's vital. We had testimony before this panel, all the way back in 1985, that indicated that there wasn't any need to produce this TACAMO very quickly. In fact, they say that the mission could be performed for many years to come with existing equipment.

Then 2 or 3 weeks ago we have an article here where the TACAMO or the E6A lost portions of its vertical tail fin and right horizontal stabilizer during flight testing.

Isn't this a case of where we have paid a lot and now we're finding out after we've paid everything out, General, we are now finding that we've got problems with the system; and we were supposed to have produced this system because—I mean, concurrency is supposed to be pushed by national security, yet, here's an example of where it was pushed for no reason.

What's the answer to this?

Mr. KRINGS. The primary answer to that was in the estimate that we made, along with the Navy, at the time the TACAMO program was proposed, the risk related to taking an existing electronic system and essentially changing airplanes with it as it was portrayed, did not appear to be a significant risk.

I don't know personally what the relationship between the Navy and the contractor for TACAMO is in terms of the acquisition rate versus what they pay for it. I don't really know. I don't know if there are checks and balances in there that will ensure that the Government is not investing full program cost before demonstration of capability.

Mr. KASICH. My understanding is we've paid all the money out for this program.

Dr. DUNCAN. I'd like to ask Mr. Rumpf to comment on that. I think he would be better able to answer that than I am.

Mr. RUMPF. In fact, we believe that the one failure that we have had was a unique situation which is not generic of this airplane. That investigation is still ongoing and as soon as we have resolved the technical issues about that, we'll be reporting back to you through our system.

This is a derivative airplane. Obviously, the E3s have the same horizontal and vertical stabilizers. We have not found any fundamental design flaw in this particular aircraft. We have Boeing's feet tied to the floor on this issue, however, because it is possible that this accident may have been caused by them through mishandling. This issue will be settled as a result of this investigation. They will have to completely repair the aircraft.

Mr. KASICH. That sounds real good. But in reality those things don't work. Let me explain why I say that. Take for example the

B-1. Now, that's a concurrent program, and I was a big defender of that program.

We find out that we have in that system a landing instrument that doesn't work right. In fact, we're going to spend about $10 million to try to fix this ILS. Do you know why it happened? Because somebody wasn't minding the store.

We end up putting a system in there and it doesn't work the way we want it to work so we've got to get it replaced. Take a guess who's going to lay the money out? The taxpayers are going to lay the money out.

Take for example the difficulties that they are having in the B-1 right now on the support system for the fuel lines. You say if Rockwell didn't live up to their part of the contract, then they would have to pay.

I'd like to know how many weapon systems we have that have been done concurrently where we actually went back and got them to make the changes that the Government felt needed to be made where the taxpayers didn't pay.

I'd like to know what those examples are. It's fine to say, yeah, we really got 'em. But I guarantee you, when we look back on this in another year, I'll be paying for it—they won't be.

So how do we avoid this? How do we avoid the problem with the B-1 if we're going to continue these programs, and particularly if we are going to concurrent things that aren't even necessary to move because of the national security reason?

Does anybody want to try to answer, or is there no answer—probably there is no answer to that, is there?

Dr. **Duncan**. I can't give a black and white answer except to say that I hope that this committee and the Congress will give the Goldwater-Nichols legislation time for us to improve the acquisition process.

The life of the weapon systems and the development time is many, many years, and we've only been in existence a short time with this new procedure. I would hope that some of the examples you've cited and the history will become better in the future.

Mr. **Kasich**. Let me tell you one other problem we have——

Mr. **Krings**. I might like to answer the last question just a moment.

The ILS system in the B-1. That was not unknown. We reported it to you all in 1987. We reported it again in 1988. So it wasn't that it wasn't known. If it wasn't fixed—I don't like to say that's somebody else's problem, it's all of our problem. But it wasn't the fact that it wasn't known and it wasn't reported.

Mr. **Kasich**. No, but the problem we have is that we're going to pay for it. The contractor's not going to pay for it; we are.

Mr. **Krings**. We—right.

Mr. **Kasich**. The taxpayers.

Mr. **Krings**. We—taxpayers, that's right.

Mr. **Kasich**. Right.

Mr. **Krings**. But the fact is that we're not contracting like that anymore. I think you've answered the question, and that is, we are changing the way we do business.

Mr. **Kasich**. OK, I hear that. But let me give you another example. I always get frustrated by the fact that it's the best of intentions—and there's an old saying about the best of intentions—let's talk about base-lining and cost-capping.

Frank Carlucci came up here in the middle of the ill wind scandal and testified that the thing he's most proud of, of the Pentagon reforms that occurred on his watch in recent years was the baselining of weapon systems. We're going to have a report that will be available to us next week that will show us that you are currently involved in breaching baselines and not doing anything about it. You're changing the baselines. You are reestablishing the baselines.

So if you really do have a system that guarantees integrity, and if you really have a system that guarantees toughness, then you wouldn't be finagling with these baselines. Then we have these concurrent programs and there's no way you can base-line and cost-cap a system if you're not testing upfront.

You want us to multi-year fund your programs, and we're willing to fund your multi-year programs but we're not willing to do it when you don't have proper testing to make sure we're getting our dollar's worth. That was really kind of the informal deal we made.

So if you're saying to me, we're doing a much better job—where? Where is it that we're doing this greater job?

When are you going to come up here——

Mr. Krings. C-17, B-2, AMRAM—there's a lot of programs in which we're doing a better job.

I agree we're not doing a better job in TACAMO. That was done when? That was agreed upon about 3 or 4 years ago, wasn't it? Three years ago—I can barely remember when it was. It has been sometime ago.

But we're allowed to get better. In fact, we are getting better, and we'd like to continue to get better.

Mr. Kasich. We're not getting better on any system I can think of that has been produced. Everything is over the next horizon. We're getting better on B-2.

I remember the B-2 testimony we had here and what we were going to pay for each of the B-2s, and how small the amount was over what we were going to pay for B-1. Now, we're still not very far along and, yet, if I was to take a look at the amount of money we're going to pay for this system, the increase in it has been staggering.

Now, I'm glad you came up and told us that so we can decide whether we want to buy that plane or not. I give you credit for that. But what I'm concerned about is that we see it in reality. We actually see you come up here and say—of course, you did do it on DIVAD, and Congress tried to keep that thing flying; I give you credit on that program. But so many of these programs I feel as though we hear this nice talk but when the rubber meets the road and we actually go out and try to make the systems work or force those who build it to pay for it, somehow the contracts aren't tight enough and we slip through.

Mr. Chairman, I want to thank you for having this hearing because we obviously can't allow this to continue. This is just money going down the tubes. I'm stunned at these charts I see, and I hope that we can help them to do a better job when it comes to our time for our markup, like Mr. Sisisky pointed out a few minutes ago.

Thank you.

The CHAIRMAN. Anybody else? Questions for the record?

Mr. SCRIVNER. Yes, questions for the record.

The CHAIRMAN. We will have some questions for the record.

[The following questions were submitted to be answered for the record:]

HEARING ON WEAPON SYSTEMS TESTING AND PRODUCTION DECISION-MAKING

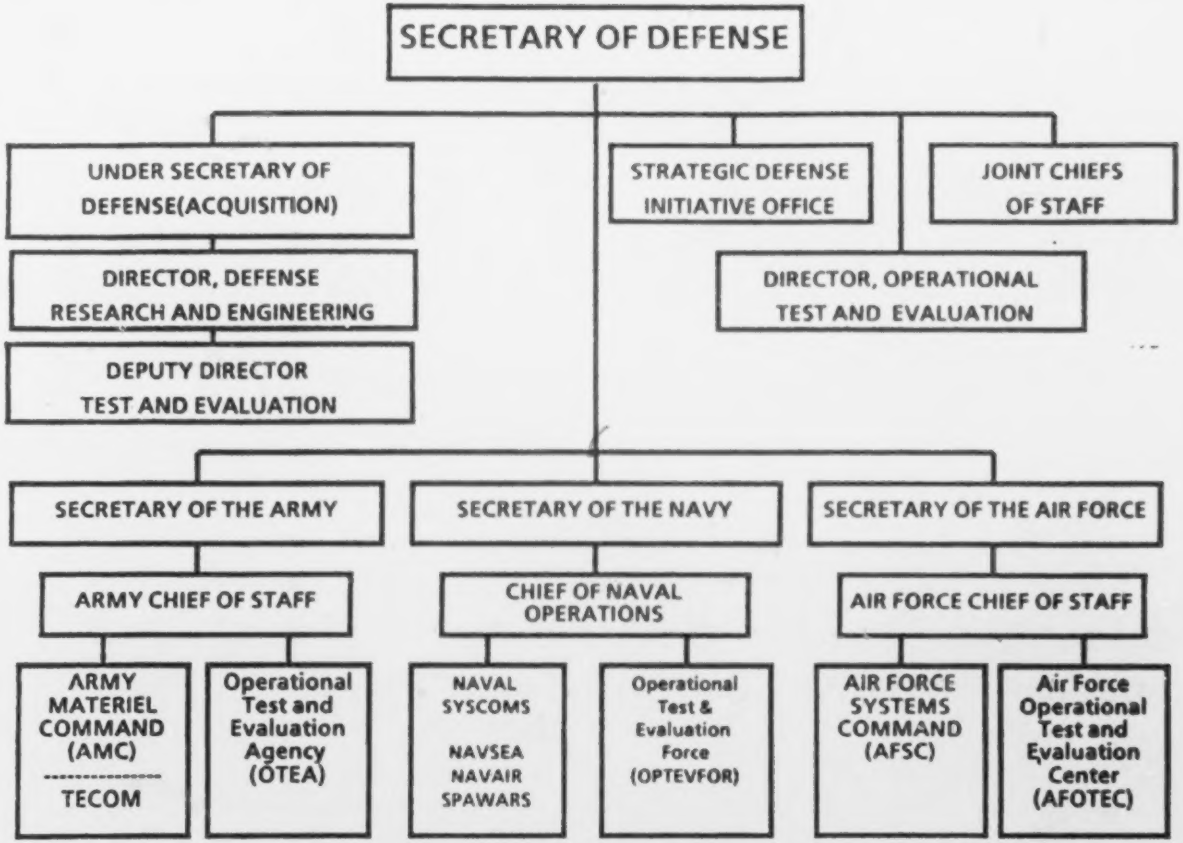
QUESTION: Please outline the structural relationship between the Development Test Office, the Live Fire Test Office and the Operational Test Office and the Defense Acquisition Board/Defense Resource Board decision makers.

ANSWER: The DoD test and evaluation (T&E) organizational structure is as depicted in Figure 1. The Development Test Office, actually the Office of the Deputy Director, Defense Research and Engineering (Test and Evaluation) (DDDRE(T&E)) is a part of the staff of the Director, Defense Research and Engineering under the Under Secretary of Defense (Acquisition) (USD(A)). The Live Fire Testing Office is a part of the DDDRE(T&E)'s responsibilities. The Operational Test Office is the independent test agency created by the Congress in 1983. The Director, Operational Test and Evaluation reports directly to the Secretary of Defense and Congress, thus being independent of the USD(A) staff.

The Defense Acquisition Board (DAB), which is the senior DoD corporate board for acquisition decision matters, was created following the Packard Commission findings, and is chaired by the USD(A). Operating through ten committees, it provides the primary forum for DoD Components to resolve issues, provide and obtain guidance and make recommendations to the Defense Acquisition Executive on defense acquisition matters. The USD(A) is the Chairman and the Vice Chairman JCS is the DAB Vice Chairman. Dr. Duncan's testimony of 8 March listed the DAB membership (Figure 2).

The ten DAB committees, which track various aspects of RDT&E, are shown in Figure 3. The DOT&E and DDDRE(T&E) are members of several of these committees. One of these is the Test and Evaluation Committee (TEC), which reviews and guides test policy and test resource investments. Other T&E Committee members are shown in Figure 4, drawing heavily upon the Service's Staff T&E functions, plus the two major Defense Agencies with test responsibilities: DARPA and DNA. Clearly, the DAB and its committees represent a strong corporate flavor for program reviews and decision making.

The Defense Resources Board (DRB) is not a direct part of the DoD acquisition process, but rather it is a formal part of the Planning, Programming, and Budgeting System (PPBS). The DRB recommends resource allocation from a global viewpoint, not just the slice for RDT&E. Within the PPBS, the DoD test organizations play a major role in influencing the dollars available for test resource investments, and for the test adequacy of major weapons system programs. The DOT&E is a DRB member, as is the Director, Defense Research and Engineering (DDR&E).


SECRETARY OF DEFENSE
UNDER SECRETARY OF DEFENSE(ACQUISITION)
STRATEGIC DEFENSE INITIATIVE OFFICE
JOINT CHIEFS OF STAFF
DIRECTOR, DEFENSE RESEARCH AND ENGINEERING
DIRECTOR, OPERATIONAL TEST AND EVALUATION
DEPUTY DIRECTOR TEST AND EVALUATION
SECRETARY OF THE ARMY
SECRETARY OF THE NAVY
SECRETARY OF THE AIR FORCE
ARMY CHIEF OF STAFF
CHIEF OF NAVAL OPERATIONS
AIR FORCE CHIEF OF STAFF
ARMY MATERIEL COMMAND (AMC)
TECOM
Operational Test and Evaluation Agency (OTEA)
NAVAL SYSCOMS
NAVSEA
NAVAIR
SPAWARS
Operational Test & Evaluation Force (OPTEVFOR)
AIR FORCE SYSTEMS COMMAND (AFSC)
Air Force Operational Test and Evaluation Center (AFOTEC)

DOD TEST AND EVALUATION ORGANIZATIONAL STRUCTURE

DEFENSE ACQUISITION BOARD

PURPOSE -- SERVE AS THE PRIMARY FORUM TO RESOLVE ISSUES, PROVIDE AND OBTAIN GUIDANCE, AND MAKE RECOMMENDATIONS ON MATTERS PERTAINING TO THE DOD ACQUISITION SYSTEM.

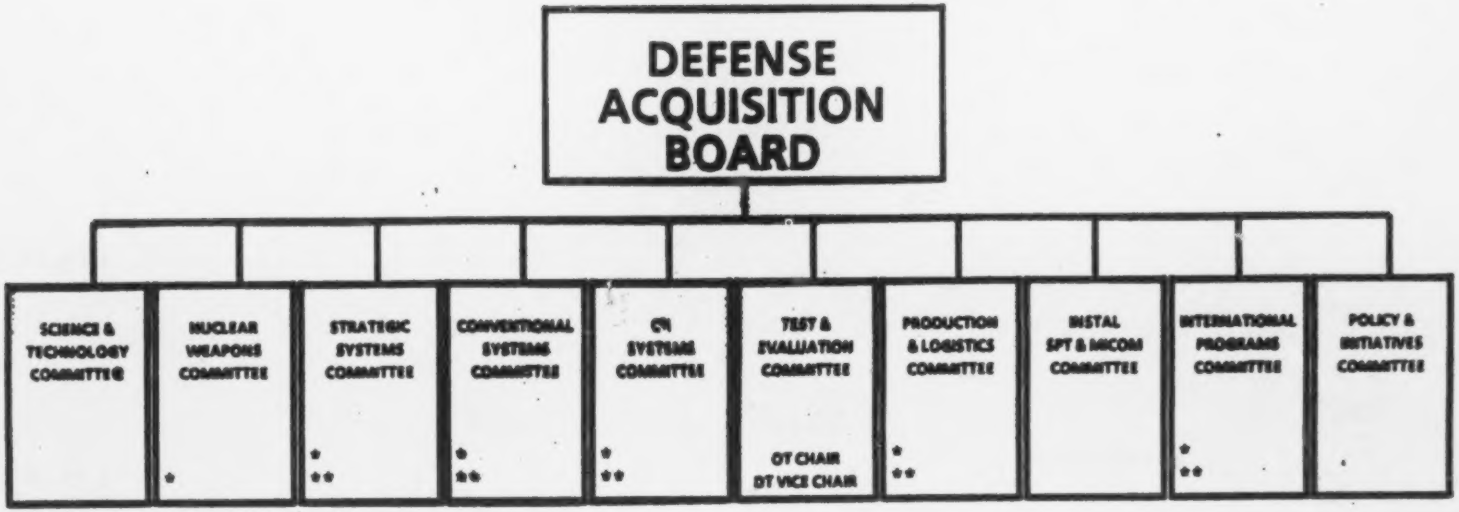
MEMBERSHIP - USD(A) - CHAIR
- VC,JCS - VICE CHAIR

DUSD(A)
DoD COMP
ASD(PA&E)
ARMY SAE
NAVY SAE
AIR FORCE SAE
ASD(C^3I)
ASD(P&L)
ASD(FM&P)
DDR&E
DOT&E
D,PI

PLUS: CHAIRMAN OF THE APPROPRIATE ACQUISITION COMMITTEE

As of April 1989

DEFENSE ACQUISITION BOARD
ACQUISITION COMMITTEES


DEFENSE ACQUISITION BOARD
SCIENCE & TECHNOLOGY COMMITTEE
NUCLEAR WEAPONS COMMITTEE
*
STRATEGIC SYSTEMS COMMITTEE
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**
CONVENTIONAL SYSTEMS COMMITTEE
*
**
C3I SYSTEMS COMMITTEE
*
**
TEST & EVALUATION COMMITTEE
OT CHAIR
DT VICE CHAIR
PRODUCTION & LOGISTICS COMMITTEE
*
**
INSTAL SPT & MICOM COMMITTEE
INTERNATIONAL PROGRAMS COMMITTEE
*
**
POLICY & INITIATIVES COMMITTEE

* DOTE MEMBERSHIP

** DDDRE(T&E) MEMBERSHIP

Figure 3

TEST AND EVALUATION COMMITTEE (TEC)

PURPOSE - TO PROVIDE A FORUM TO DISCUSS AND RESOLVE TEST RESOURCE AND POLICY ISSUES

MEMBERS DOT&E - CHAIR
DDDRE(T&E) - VICE CHAIR

DUSA(OR)
ASN(RE&S)
ASAF(A)
ASD(C^3I)
D,PI
ASD(PA&E)
D,DARPA
D,DNA

HEARING ON WEAPON SYSTEMS TESTING AND PRODUCTION DECISION-MAKING

QUESTION: Briefly explain the respective roles and responsibilities of each office and where each office fits into the acquisition decision making process.

ANSWER: In addition to his direct reporting responsibility to the Congress, the Director, Operational Test and Evaluation serves as the Principal Staff Assistant and Advisor to the Secretary of Defense on OT&E in the Department of Defense, and is the principal OT&E official within the senior management of the Department of Defense. His responsibilities include prescribing policy and procedures for the conduct of OT&E; providing advice and recommendation to the Secretary of Defense;, designating programs as major for OT&E purposes; monitoring and reviewing all DoD OT&E; coordinating OT&E conducted jointly by DoD Components; initiating actions to ensure OT&E for major defense acquisition programs is designed to evaluate system operational effectiveness and suitability; making recommendations on budgetary and financial matters related to OT&E; reporting on the adequacy of operational test planing, priorities, support resources, execution, evaluation, and reporting for Major Defense Acquisition Programs. More detailed responsibilities are found in DoDD 5141.2 and DoDD 5000.3. The DOT&E office fits into the acquisition process on several levels. At the staff level, involvement ranges from an effort to encourage DoD components to develop explicit operational requirements for a new system within the DoD Components, to monitoring of tests and the review of test results from the DoD Components. The staff also interfaces with the USD(A) staff to heighten awareness of the need for explicit operational requirements, as well as the progress in fulfilling those requirements. DOT&E also participates in the Defense Acquisition Executive Summary (DAES) process which is designed to identify emerging or potential problems in major acquisition programs. In that context DOT&E assists in the independent assessment of the status of operational test and evaluation, and reviews DAES reports to ensure consistency with test planning documentation. In preparation for DAB deliberations, the DOT&E staff provides read-ahead assessments for the DAB members and participates in DAB committee activities. The DOT&E staff also actively participates in the Defense Resource Board review of major programs, developing relevant position papers for DRB deliberations, and participates in the staffing of options for the Program Decision Memoranda. The DOT&E office also provides information to the acquisition decision process through review and coordination on the Selected Acquisition Reports, T&E Section of the Congressional Data Sheets prepared by the Services, and Contract Award Reports which are provided to the Congress by the DoD Comptroller's office. This is in addition to their interface with Congressional staffs, preparation of periodic Highlights provided to the congressional staffs, and the formal Beyond Low Rate Initial Production (B-LRIP), and Annual Reports prepared for the Congress. While the foregoing is not all inclusive, it provides a synopsis of the ways in which the DOT&E office provides information to decision makers in the DoD acquisition process.

The DDDRE(T&E) functions are to establish development T&E policy for Defense weapon system acquisitions; provide DT&E assessments to DAB and senior decision makers; provide direction to Services on DoD test support resources; execute OSD programs to enhance T&E capabilities; manage Joint Test and Evaluation programs, advanced threat systems, and long range planning for future test support resources, manage the Live Fire Testing (LFT) program; and manage the Foreign Weapons Evaluation/NATO Comparative Test (FWE/NCT) program.

The DDDRE(T&E) serves the Director, Defense Research and Engineering (DDR&E) as the focal point for DT&E oversight of major and designated defense acquisition programs. The DDDRE(T&E) staff is responsible for providing periodic reports and assessments on the DT&E aspects of designated programs, for providing formal DT&E reports to support the DAB, DRB, and DAB acquisition committee decision making process. These reports are forwarded by DDDRE(T&E) to the appropriate board or committee for inclusion in the read-ahead material provided to the DAB/DRB/Committee principals. In addition to this oversight function, the DDDRE(T&E) staff is also responsible for processing and reviewing DoD Component-approved Test and Evaluation Master Plans (TEMPs), and obtaining OSD approval/disapproval of the document in the form of joint DOT&E and DDDRE(T&E) concurrence on TEMP disposition.

QUESTION: With these various activities, who is in charge of the test community overall? If no one, should there be someone? If so, who?

ANSWER: There is not one single person in charge of the DoD test community overall. DoD test activities are currently viewed from two distinct perspectives; developmental and operational. To use Mr. Krings' words from his March 8, 1989 testimony to the House Armed Services Committee, "We must think of T&E in terms of "make it work" and "does it work." The "make it work" activity is clearly a part of the developmental community and is headed by the DDDRE(T&E) within the USD(A) office. The "does it work" activity is carried out by independent testers such as the DOT&E and the Services' operational test agencies.

The two separate OSD offices in charge of the test community are DOT&E and DDDRE(T&E); both develop and operate under a single DoD Directive 5000.3, "Test and Evaluation." There is a continuous informal interface between the offices, and formal interface through the DAB Test and Evaluation Committee (TEC). The TEC facilitates the accomplishment of the responsibilities and functions of the Department in the T&E area. Operating in support of the Defense Acquisition Board, and the Deputy Secretary of Defense, the TEC is the primary forum within DoD for Components to identify and resolve issues and to develop recommendations on resource matters in the test and evaluation area. The close cooperation between the two OSD offices has done much to improve the effectiveness of OSD level T&E oversight.

QUESTION: What has been the experience to date in achieving coordination among the various test offices? Why are the various offices described as "oil and water?"

ANSWER: We were not aware of the "oil and water" characterization. Our experience to date in achieving such coordination has been excellent within OSD. Although the responsibilities of the T&E agencies overlap somewhat, the individuals within the organizations ardently strive to support the needs of the Congress, and the Defense Department. Close coordination, both informally and through the Test and Evaluation Committee (TEC), does facilitate the activities of all DoD T&E offices. The OSD T&E organizational structure is carried through in the Services where the Test and Evaluation Principals report to the Service Acquisition Executive rather than the Service Secretary directly. Of course the Service's independent Operational Test and Evaluation Agencies or Commands report directly to the military leadership within their respective Services.

QUESTION: What has been the experience to date with the military departments accepting the guidance and direction of the test offices and the early involvement of the tester in the process?

ANSWER: From the developmental test perspective, the "make-it-work" tester has always had an early involvement in the defense acquisition system process. During these times of increasing concern and resource constraints affecting weapon systems acquisition, the development test community continues to strive for measurable demonstrations of system performance characteristics to support the decision maker in declaring a system ready for operational test. This process has been hampered by the Congress', public's or press' perceptions that failures should not occur in DT&E. The reaction on the part of program managers is to make activities success-oriented, allowing insufficient time, schedule or resources for potential failures. Failures should be looked on as an integral part of the system maturation process, for DT&E failures provide the learning experience and opportunity to correct system discrepancies prior to formal operational test.

From the operational test perspective, the experience was initially one of reluctance to modify established ways of doing business. However, over the past several years the relationship has improved, with the establishment of a T&E focal point in the headquarters staff of each of the Services. Participation of the Service T&E official in the Test and Evaluation Committee of the Defense Acquisition Board has also been useful. The formal guidance relative to T&E is provided to the Services through DoD Directive 5000.3 and associated manuals. The Services, in turn, develop implementing directives. During our review of specific test programs, and in our formal briefings from the Services, guidance and direction is also provided to the Services. Generally, we find it is accepted and followed. In those instances where the Services exhibit a reluctance to accept the OT&E guidance and direction, the matter would be resolved through the Secretary of Defense or, if necessary, with the Congress. We have not found that final option, however, to be necessary.

Concerning early involvement, both the development and operational test communities are involved early in the acquisition process. This is particularly important in programs which involve procurement of a few items over an extended period (e.g., ships, satellites, unique platforms), characterized by the first platform fabricated being used for operational as well as for test purposes. In other instances, a "concurrent" acquisition strategy may have been approved by the Congress. Such strategies are not automatically exempt from the provision of law concerning beyond-LRIP decisions. However, on a case-by-case basis, an attempt may be made to devise a methodology wherein progressive program commitments are tied to increasing system maturity.

The Service operational test agency then will review/monitor component and development testing (including simulation, modeling, and analyses), and prepare early and progressive operationally- oriented assessments. Those assessments augment any actual operational test results to support production decisions and consider/evaluate all pertinent information as it becomes available, regardless of source. They include an assessment of potential operational effectiveness and suitability and an identification of planned operational testing (including schedule and responsibilities). A formal operational test then must be completed as soon as practical to evaluate actual operational effectiveness and suitability. Early involvement of the operational test community does occur and is particularly important in those instances wherein the Congress has approved acquisition rates/timing which precludes strict adherence to the provisions of sections 138 and 2366 of Title 10 USC.

The Services are getting their operational test agencies to participate earlier in the acquisition process. Early operational tests and operational assessments are now frequently being provided during the development and validation phase before Milestone II as well as early in the engineering development phase. The operational test agencies themselves are showing creativity in finding ways to address, although not always resolve, operational issues earlier.

QUESTION: Have you encountered any reluctance on the part of the military departments to accept guidance and direction with regard to test and evaluation plans and milestones for individual programs? If so, what has been the basis for their concerns?

ANSWER: There has been some reluctance on the part of all Services to accept OSD guidance and direction for the T&E of some weapons systems. The primary reason for this reluctance stems from differing professional judgment on what testing is really required to resolve the critical operational and developmental issues affecting a weapon system. It is based, in part, on the Services' concerns associated with the cost of the imposed additional testing, and its potential impact on acquisition schedules and Initial Operational Capability (IOC), -- not enough time, not enough money, not enough resources. DOT&E usually has less difference with the Services operational test agencies than with the program manager or the Service as a whole.

QUESTION: Review of past studies on DoD acquisition policies indicates that one of the major problems with Defense acquisition is the mismatch between perceived requirements and available resources. DoD reluctance to make the necessary trade-offs results in inadequate funds being applied to a number of programs. What steps are being implemented to make the necessary tradeoffs that adequate and stable funding occurs for adequate and realistic testing and that reasonable acquisition strategies are implemented?

ANSWER: Within the Department, steps were taken as early as the FY 1988/1989 program review (CY 1986) to provide funding stability for adequate and realistic testing. In the late summer of 1986, as a direct result of issues raised by the DOT&E to the DRB, the Deputy Secretary (1) directed the establishment of the DoD Test and Evaluation Council (now the Test and Evaluation Committee (TEC)) to review T&E resource issues and (2) approved funding for the OT&E Capability Improvement Program (CIP). The TEC is the key. The DOT&E, as chairman, and the DDDRE(T&E), as vice-chairman, have implemented a corporate T&E resource planning process that brings the

Services, Agencies and OSD offices with a T&E interest together to review and validate current T&E resources (funding and capabilities) and resource needs for budget consideration. The result of that review for the FY 1990/1991 budget was a decision by the Department to add $1.3 Billion over the FYDP to program element 0604940D, Test Instrumentation Development, in the DDDRE(T&E) appropriation to begin to redress significant test capability shortfalls.

The CIP was approved in 1986 to help the OT&E capabilities within the Department achieve parity with what was a largely (albeit seriously deficient) DT&E capability. As we have stated on several occasions, the focus of the CIP is near-term, short-duration, high-payoff investments that will materially reduce limitations to test realism. By itself, the CIP does not provide the level nor the stability of funding needed, but in combination with the corporate T&E planning process and the additional funding cited above, stability is within reach. T&E capability funding is not yet fully adequate, because the TEC identified a shortfall approximating $12 Billion; however, given the current budget climate, it is a good start.

Regarding your question on the implementation of reasonable acquisition strategies, the DAB and its committee structure has injected considerable discipline into the acquisition decision process. Most of the data elements necessary to make fully informed decision are on the table. With the recent addition of Early Operational Assessment data from the DOT&E and institution of the Maturity Matrix (again by the DOT&E) as a means to measure program progress, we should have all the tools needed to direct reasonable acquisition strategies. Information will be available, but, in a period where Warfighting Capability will always fall short of the need, the decisions will be no less difficult.

QUESTION: It would appear that the emphasis on concurrency is premised on optimistic development schedules and successes, i.e., the most uncertain part of the process. What steps has DoD taken to either establish a standard definition or criteria by which to measure or manage concurrency?

ANSWER: Program concurrency and test concurrency arise as part of the acquisition strategy developed by the Services. A typical dictionary definition of concurrent is "occurring or existing at the same time or side by side." For acquisition, concurrency means some degree of overlap in events or activities rather than they're being conducted in a serial fashion. In his March 8, 1989 testimony to the House Armed Services Committee, Mr. Krings characterized concurrency as the situation in which a production go-ahead is authorized before formal operational test is accomplished. Generally, concurrency is a management technique used to speed up the acquisition process. For the test program, concurrency means performing higher level system tests before completing the previous phase, or beginning the operational test effort before development of the system is completed. A major advantage of early OT&E is the ability of the user representatives to influence system attributes before large amounts of money are committed or spent. The negative side is that system level operational tests may be performed before the system is sufficiently production representative. Current management initiatives for Early Operational Assessments and System Maturity Matrices are aimed at overcoming the problem of delaying an operationally-oriented evaluation until the complete system is available and the majority of program funds have been committed.

QUESTION: What steps has DoD taken to implement a management review plan to determine whether sufficient test assets, facilities, target and threat simulators have been planned, budgeted, and executed for programs?

ANSWER: The DoD, through the Test and Evaluation Committee (TEC), has implemented a process to review and validate current T&E resources and resource needs. The product of that review is a corporate T&E investment strategy to provide for sufficient test assets, including such items as test facilities, targets, threat simulators, and test instrumentation. The "zero" generation product of that process is an additional $1.3 Billion over the FYDP to begin to redress validated test capability shortfalls. The process is being institutionalized through a document entitled the Test Resource Master Plan (TRMP), which is currently in draft and will be published in June 1989. It will describe an architecture for the DoD National Test Capability Base (NTCB), explained in our Management Plan for the Major Range and Test Facility Base provided to you under a October 3, 1988 memo. It will also provide clear management and investment guidance to the Services, Agencies and OSD to assure continued progress towards an adequate NTCB. Through the TEC mechanism, the full participation of the Services, Agencies and OSD is assured and a "corporate" plan is developed.

QUESTION: What criteria does DoD use to determine the structure, scope, and schedule for a test program for an individual system?

ANSWER: To plan a T&E program for a new weapon system, we first look at the mission of this new system and the threat against which the system will be employed. From this we develop a series of questions or critical developmental and operational issues which must be resolved in order to determine if the system will meet required performance characteristics, and will be operationally effective and suitable in combat. These issues cover the full range of the weapons systems performance including such effectiveness issues as its ability to kill a threat, its ability to provide communications in a jamming environment, or its ability to survive hostile action. All suitability issues such as reliability and logistics supportability are also planned for resolution.

Once the critical issues are established, the test objectives and activities can be laid out to resolve those issues. Based on the acquisition strategy, the timing of the test activities will be structured to provide appropriate test results to the acquisition decision forums. The higher the risk on a particular issue, the sooner in the acquisition process it must be assessed. Once this schedule of test events and acquisition decisions is established, DoD is working to make acquisition decisions more event based, that is, dependent on test results, than schedule based. However, specific, regimented criteria, applicable to all systems are not available due to variations in weapon system requirements and acquisition strategies. The controlling document is the Test and Evaluation Master Plan (TEMP), reviewed and approved by OSD for all major programs, T&E oversight programs, and Live Fire Testing designated programs.

QUESTION: In its March 12, 1986, directive on test and evaluation, DoD cited the publication entitled, "Procedures Manual - Improving Test and Evaluation Effectiveness in Support of the Major Weapons Systems Decision Process." Committee staff advises that the publication is not printed. When will it be available? Why has there been a delay?

ANSWER: There has not really been a delay in the publication of T&E policy/guidance. The March 1986 edition of DoDD 5000.3 provided for the issuance of several manuals to amplify various aspects of Test and Evaluation guidance, and provide insights for the test communities. These were numbered DoD 5000.3-M-1 through 5000.3-M-5. We have methodically worked our way through the issuance of these manuals. DoD 5000.3-M-1 (Test and Evaluation Master Plan (TEMP) Guidelines) was published in October 1986, revised in February 1988, and is currently being updated again. DoD 5000.3-M-2 (Foreign Weapons Evaluation and NATO Comparative Test Programs Procedures Manual) was published in August 1988. DoD 5000.3-M-3 (Software Test and Evaluation Manual) was published in November 1987. Department of Defense 5000.3-M-4 (Joint Test and Evaluation Procedures Manual) was published in August 1988. A DoD Guideline for Live Fire Testing (unnumbered) was published in June 1988. A new Guide to Preparing Beyond Low-rate Initial Production Reports was published in August 1988. Policy guidance for the application of modeling and simulation in support of operational test and evaluation (unnumbered) was published in January 1989. The last in the series is DoD 5000.3-M-5 entitled "Procedures Manual - Improving Test and Evaluation Effectiveness in Support of the Major Weapons Systems Decision Process" and is currently under consideration. It has been prepared in draft form and is now in the OSD and Service coordination and review cycle. Implicit in the draft is an intertwined approach to developmental and operational testing, the scope of which is a matter under consideration. This last manual in the series will be published when the internal DoD staffing and coordination cycle is completed.

QUESTION: What action has DOD undertaken to implement comprehensive risk assessments for major weapons programs, either for internal management or for use by the Congress. Such risk analysis might address areas where problems might develop:

a) the nature of the enemy threat;
b) the availability of adequate means of testing;
c) the kind of technology involved;
d) the manufacturing methods.

ANSWER: Program risk analysis, in its broadest sense, is overseen by the Defense Acquisition Board (DAB) as a major system moves through the acquisition cycle. For those programs they manage directly, the Services parallel this risk analysis approach through their System Acquisition Review Councils. This answer uses the term "risk analysis" to encompass not only risk assessment, but also risk reduction and risk management, and is the concept currently taught to program managers attending the Defense Systems Management College at Fort Belvoir, Virginia. The current DoD policy and approach to risk analysis is an outgrowth from the so-called "Carlucci Initiative" of 1981, and the more recent Packard Commission recommendations. For example, early in a program's life, the risk analyses take the form of cost analyses. This process also addresses schedule risks. A specific example of a quantitative analyses tool is the Total Risk Assessment Cost Estimate (TRACE) developed by the U. S. Army, and referred to by name in Dr. Carlucci's Initiative Number 11. The other Services have adopted TRACE or developed similar methods.

Regarding analyses of the threat, that process takes place at every milestone. The Defense Intelligence Agency is responsible for presenting a System Threat Assessment Report (STAR). In addition, each Service continually assesses threat risk through the Foreign Science and Technology Center. All of this information is taken into account by test agencies in evaluating hardware.

The availability of adequate means for developmental and operational testing is considered during long range planning by various agencies including the DoD Test and Evaluation Committee. Thorough analyses of the Test and Evaluation Master Plan provides an assessment of the risk related to the DT and OT phase of testing. Additionally, these risk analyses are continued during reviews of the actual test plans prepared by the DoD Components.

The kinds of technology involved and the manufacturing methods are also addressed throughout a program's acquisition cycle. Again, these may be included in a cost analysis, or may be part of specific trade studies. The review of manufacturing methods culminates in the formal Production Readiness Review and the Milestone III Production decision.

QUESTION: What is the rationale for a policy that permits programs that do not go through the classic acquisition milestones to enter low rate production (Milestone IIIA) and delay a full-rate production decision (Milestone IIIB) until well after a large quantity of the inventory is bought (Phoenix Missile)?

ANSWER: The process of transition from development to production is not a discrete, sharply drawn phase which has a distinct production start and development completion point. Rather, the progress of a program through this transition is characterized to a certain degree by concurrency and overlap. A limited amount of concurrency, when appropriately planned for, is in fact, desirable and has certain advantages. Of course, the degree of concurrency is always a matter of informed judgment.

For example, in many cases, it is much more effective to keep a limited production line open, as the production units are being tested, in order to benefit from ongoing engineering judgments. This approach avoids costly stoppage and start-up procedures, which are inherently inefficient, adding cost and time to the program schedule. Ship programs, due to their special characteristics of low production volume and high complexity, are prime examples of such programs. Planned, managed concurrency also assists the department in meeting initial operational capability in a timely manner.

Regarding programs where full rate production becomes delayed, that is not originally planned to occur. However, when developmental or operational testing encounters delays, the initial low-rate decision may need to be repeated, and then repeated again, while fixes are found and verified. The repetition of low-rate decisions can also be a fall-back position when major funding cuts occur.

QUESTION: How do you establish the total quantity for low-rate initial production? What criteria are used and what checks and balances exist to preclude running the total procurement on a LRIP basis and thereby evading additional program reviews and test milestones that are tied to full-rate production?

ANSWER: Low Rate Initial Production is any manufacture of a system in limited quantity to be used in Operational Test and Evaluation (OT&E) for verification of production engineering and design maturity and to establish a production base. The total quantity is driven by economics as well as the quantities needed for testing. However, due to program variations, there are no fixed criteria. Financial constraints and economic delivery rates are significant considerations and may heavily influence the determination of production rates and quantities. The total quantities question has many facets. If the objective were to build articles only for OT&E, one number may be required. If the purpose is to prove out the production technology and assembly line, a different quantity may be dictated. Additional considerations may include the time between LRIP and full production, the military urgency for the system, the type of system under consideration, military force structure considerations, and interrelationships among program elements. A system of checks and balances includes the identification of LRIP quantities in the Test and Evaluation Master Plan (TEMP) which must be approved by both DDDRE(T&E) and DOT&E. The latest revision to DoD 5000.3-M-1 includes a requirement that the TEMP identify planned LRIP quantities and the anticipated time (Fiscal Year) when approval to exceed LRIP will be requested. Consequently, the OSD test and evaluation offices provide checks and balances to review the planned production quantities/rates which are established by the acquisition communities. During the annual review of Service test programs, through the coordination on various documents, and through the review of Service program briefings, we continually assess production quantities, making adjustments where warranted.

QUESTION: Do these criteria apply to non-Defense Acquisition Board programs? If not why?

ANSWER: The notion of standard criteria for the Service-managed programs is approached in essentially the same manner as for the major programs within OSD. In like manner, program variations, objectives, funds, schedules, and so on, do not allow application of rigid rules.

QUESTION: The committee has been told that the use of fixed price contracts is beneficial to the government because it reduces risks and holds costs. How has this practice fared? How has the government fared in cases where critical performance specifications have not been demonstrated through operational tests such as with the T-45 and MSE program?

ANSWER: It is long-standing departmental practice to use fixed-price contracts if the product requirement is well defined and the cost to make it is known within reasonable limits. Currently, about eighty percent of our contracts are fixed-price type. Since this has never been controversial, we assume that the question is directed at the practice of fixed-price contracting for major defense development efforts, which became more common in the mid nineteen-eighties. Fixed-price development contracting has not fared well in practice. It has predictably failed to reduce the risk of defense development programs, and, while it may have lowered the immediate cost to the Department of certain programs, it has done so at an unacceptable long-term price. The performance and schedule risk in a defense development effort is mainly a function of the nature of the work to be performed. No contract (whether fixed-priced or not) can compel delivery of the desired product at the desired time if specifications prove to be unrealistic as development proceeds. Similarly, the main determinant of program cost is the character of the work to be performed. Fixed-price development contracting does not alter real program cost but rather transfers the cost risk of a program from the Department to the contractor. In some cases, this has in the short term lowered the cost paid by the Department for development programs as the contractor, operating under a fixed-price, has had to pay for completing development out of his own funds. In the long run, however, the practice of fixed-pricing such programs weakens companies financially, and can even cause them to leave the defense business altogether. This leaves the Department with a less competitive and less capable industrial base. In this connection, you might wish to consult the 1987 study of Navy fixed-price development contracting done by the Surveys and Investigations Staff of the House Appropriations Committee.

Regarding the two programs you mention as examples, both the T-45 and MSE programs were approached as Non-Developmental Items (NDI), and had significant problems during operational tests. Originally, the NDI attributes suggested there would be low performance and schedule risk if fixed-price type contracts were used. As the program matured however, development efforts were required to satisfy operational requirements. The inflexibility of the contracts caused performance compromises that were documented in the operational tests.

QUESTION: Increased attention is being paid to the use of a performance or system maturity matrix (milestone or event accomplishment driven rather than date or calendar driven) with major programs such as the B-2. Does the government intend to use this approach on all major acquisitions in the future? Will the matrix be part of the contract?

ANSWER: For the first question, the use of a technical characteristics matrix is required by Revision 1 to DoD 5000.3-M-1, TEMP Guidelines, for developmental performance issues. With respect to the operational performance of the system, in order to gain early insight into the emerging capability of the system, we have developed the concept of a system maturity matrix. This matrix approach better provides for a continuing assessment of the anticipated operational capability of the system. The TEMP provides both technical characteristics and operational capabilities which will be evaluated (or assessed) during testing. No determination has yet been finalized concerning the manner in which the matrix would be part of the contract for system acquisition.

Mr. Aspin. Mr. Krings, recent press articles have stated that the OT&E has acquired - through the "White Market" - certain types of Warsaw Pact aircraft for operational test support purposes. Information currently available shows that these aircraft have not been flown since late September 1988. Is there a problem? Why is there a delay in a contract being awarded to do this work?

Mr. Krings. The aircraft have not been flown since late September 1988 because of Congressional actions preventing the award of contracts and execution as planned. FY 1988 RDT&E appropriation for the Operational Test and Evaluation Capability Improvement Program (OT&ECIP) was 100% obligated at the close of FY 88 (September 1988). FY89 funds are required to return to flight operations. The Appropriations Conference Committee fenced FY 89 funds pending

Secretary of Defense certification and a review by GAO. The Secretary of Defense certification has been completed (9 Jan 89), and the GAO report has been completed or nears completion. Responsible Congressional staffers have been informed of the GAO review in each stage and are fully aware that the final report is expected to be favorable. Yet, the FY 89 funds have not been released.

Mr. Aspin. Mr. Krings, please explain the planned use of this foreign equipment. Who supports the aircraft? By whom and in what fashion are the contracts administered?

Mr. Krings. Presuming the question is addressing threat aircraft only, the following answer is provided. The aircraft are intended to be employed in support of the operational test of the following blue systems: FAADS, AMRAAM, F-14D, AIM-54C, AAAM, F-16C, JTIDS, and JSTARS. The aircraft will be used to provide both non-destructive and destructive presentations. The aircraft will be supported under contracts let by the Defense Test and Evaluation Support Agency (DTESA). They also administer the contracts; DOT&E will provide a Contracting Officer's Technical Representative (COTR).

Mr. Aspin. Mr. Krings, I am aware that you have requested the DoD Inspector General (I.G.) investigate the Defense Test and Evaluation Support Agency (DTESA) for possible contracting irregularities. (a.) Is there a connection between your request for an I.G. investigation of DTESA and the fact that there has not been a contract award for the use of the foreign-acquired aircraft? (b.) What is the current status of the IG's report? (c.) Is it true that DTESA has provided U.S. Government documentation to the press?

Mr. Krings. (a.) The DoD I.G. investigation into contracting irregularities is not connected with the fact that the aircraft are not flying. (b.) The IG report was submitted to DDDRE(T&E) and DOT&E for comment on April 14, 1989. (c.) It is our understanding that some documents have been released to the press. Neither the press nor anyone else has presented the DOT&E or DDDRE(T&E) staffs with documents originating from DTESA.

Mr. Aspin. Mr. O'Bryon, is there a need for Live Fire testing? And, are the aircraft procured by DOT&E for this purpose?

Mr. O'Bryon. There is a vital need for Live Fire Testing (LFT). Long weapons acquisition times, highly complex weapons systems, new technology untested in combat, tighter budgets, and a changing enemy threat all point to the critical need for LFT. Additionally, the relative lack of any significant on-going US combat (which historically has been the final test of a system's vulnerability or lethality) places more significance on a realistic and well organized LFT Program. This program provides essential support to the Department of Defense (DoD) during every phase of the weapons acquisition process by providing insights into the vulnerability and/or lethality of systems in development to allow demonstrated design deficiencies to be corrected early in the development process. Additionally, data from LFT provide the basis for the probabilities of kill (PK) which are the foundation upon which computer war games rely to assess tactics and doctrine. Weapons procurement levels and weapons mix are also driven heavily by the PK estimates. Insights into needed repair part stockage levels due to combat damage are being gained from the LFT program, and battle damage repair training/techniques are being improved by bringing service members on site to learn and actually conduct battle damage repair on these new systems.

Regarding the Soviet aircraft procured, to date, by DOT&E; they are not acceptable for LFT. The reason for this is three-fold: 1) The DOT&E aircraft are representative of some third-world forces, but not the current front-line Warsaw Pact threat against which weapon systems being developed will be assessed; 2) LFT requires a higher degree of target resolution upon which to base more technical vulnerability assessments than that required for operational testing; and 3) LFT is typically destructive which would cause the eventual damage or even possible loss of these operational test assets.

The aircraft procured by DOT&E are critically needed to satisfy target shortfalls of full-scale airframes once droning is permitted and completed. Droning is dependent on the release of the FY89 appropriation which has been withheld by the Joint Appropriations Committee. The droning effort has been placed on hold since November 1988 (5 months) due to funding impoundment.

QUESTION: Does the Department of Defense have a measure of concurrency that it uses when it reviews weapon systems before the Defense Acquisition Board? Does the Department of Defense routinely inform the Congress of how concurrent a weapon system is? Would the CBO measure be adequate, or could you develop a more useful measure and provide it to the Congress?

ANSWER: Concurrency generally refers to the overlap between the development and production of a weapon system. Although there is no DoD standard measure of concurrency, the Defense Acquisition Board reviews and recommends approval of an acquisition strategy to the Secretary of Defense through the Under Secretary of Defense for Acquisition. The acquisition strategy indicates the various development and production milestones as well as the phases of developmental and operational testing that support the strategy. The strategy clearly shows the decision makers any overlap that exists between development and production. It is important to note that this overlap is to transition from development to production in a gradual, planned process and may involve a series of events and factors such as committing long lead production funds during full scale development, verifying production capability, providing test resources for operational testing, conducting production readiness reviews, accomplishing producibility assessments, and proceeding to low-rate initial production. As an illustrative simile, this transition looks like a wedge, building up systematically from the beginning during full-scale development to the full-rate production decision.

Information on the concurrency of a weapon system is provided to the Congress in the Congressional Data Sheets (CDS) and the Selected Acquisition Reports. Although no specific measure is provided, these documents, describe the weapon system acquisition strategy, and in the case of the CDS, provide a detailed description of the completed and scheduled developmental and operational testing of the system. Congress is also provided the Director, Operational Test and Evaluation (DOT&E) Annual Report which summarizes the operational testing of major DoD acquisition programs conducted during that fiscal year. The current and previous DOT&E Annual Reports provide Congress summaries of the operational testing that has been completed on a weapon systems and can be used in conjunction with the budget submission as an indication of the program's concurrency. The fact that some weapon programs are concurrent is obvious from their very nature. Shipbuilding, for example, will routinely entail significant concurrency due to the length of time required to "produce" a ship.

As indicated, the Department of Defense (DoD) does not have a standard measure of concurrency, but rather uses the weapon system's acquisition strategy. In order to quantify concurrency, the overlap between development and production, various measures could be used. Measures based on time or dollars spent could be developed but, as pointed out in the August 1988 Congressional Budget Office (CBO) Study on Concurrent Weapons Development and Production, they would have significant limitations. The CBO study used the relationship between the system's completed initial operational test and evaluation (IOT&E) and the DoD management decision to begin production as its measure of concurrency. The study develops a formula for percent concurrency using the ratio of the time between initial production and the completion of IOT&E to the time between the beginning and end of IOT&E. The Director, Operational Test and Evaluation (DOT&E) agrees with the CBO that initial operational testing and production decisions are good parameters to consider in determining the degree of concurrency, but believes the formula proposed by the CBO could be misleading. For example, any weapon system program which had a very early phase of IOT&E would appear to have a low "percentage" of concurrency. Also, the defining of a certain percentage (e.g., 33 percent) obtained from this formula as the dividing line between degrees (e.g., "low" and "medium") of concurrency is too subjective. The DoD will develop definitions of concurrency and its degrees and provide them to Congress. Although they do not represent the DoD position, DOT&E has developed the following definitions of concurrency and its degrees:

Definition of Concurrent: A concurrent program is any program which makes or is projected to make a decision to proceed into either low-rate initial production (LRIP) or beyond LRIP before initial operational test and evaluation (IOT&E) is completed.

Presently or Projected Concurrent:

Presently Concurrent: A program for which a "concurrent" production decision has been made. The degrees of concurrency are defined below.

Projected Concurrent: A program for which the acquisition strategy calls for a "concurrent" production decision to be made, but the decision has not yet been made. Although the below definitions of the degrees of concurrency are worded for "Presently Concurrent" programs, they also apply to "Projected Concurrent" programs.

Degrees of Concurrent:

Not Concurrent: A program that completes all IOT&E before making a decision to proceed into production (either LRIP or beyond LRIP).

Slightly Concurrent: A program which makes a decision to proceed into LRIP based on a completed phase of early operational test and evaluation (OT&E).

Moderately Concurrent: A program which makes a decision to proceed into LRIP before a phase of early OT&E has been completed to support this decision.

Highly Concurrent: A program which makes a decision to proceed beyond LRIP before initial operational test and evaluation is completed.

Remarks: (1) LRIP (as defined in the 1984 DoD Authorization Act Committee Conference language) means the production of a system in limited quantity to be used in operational test and evaluation, for verification of production engineering and design maturity, and to establish a production base prior to a decision to proceed with production. (2) The quantitative value of LRIP is required to be specified in the Test and Evaluation Master Plan (TEMP). It is the DoD position that LRIP quantities be specified on a case-by-case basis, and not on a percentage-of-total-production basis.

QUESTION: What should be the disposition of program funding when a planned milestone is not achieved as scheduled?

ANSWER: The exact disposition of program funding would depend on the severity of the deviation from the planned schedule. In general, it might actually exacerbate a mild schedule slip to withhold program funding due to the deviation. If the schedule deviation would be a prudent management technique to ensure that technical problems causing the deviation received the proper attention. OSD manages the apportionment process to withhold Service obligation of funding when programmatic problems surface.

QUESTION: As the Congress reviews weapons each year, how can we know how concurrent a program is, or is planned to be?

ANSWER: Concurrency generally refers to the overlap between the development and production of a weapon system. Although there is no DoD standard measure of concurrency, the acquisition strategy indicates the various development and production milestones as well as the phases of developmental and operational testing that support the strategy. Information on the acquisition strategy is provided to the Congress in the Congressional Data Sheets (CDS) and the Selected Acquisition Reports. Although no specific concurrency measure is provided, these documents describe the weapon system acquisition strategy, and in the case of the CDS provide a detailed description of the completed and scheduled developmental and operational testing of the system. Congress is also provided the Director, Operational Test and Evaluation (DOT&E) Annual report which summarizes the operational testing of major DoD acquisition programs conducted during that fiscal year. The current and previous DOT&E Annual Reports provide Congress summaries of the operational testing that has been completed on major weapon systems and can be used in conjunction with the budget submission as an indicator of a program's concurrency. The fact that some weapon programs are concurrent is obvious from their very nature. Shipbuilding, for example, will routinely entail significant concurrency due to the length of time required to "produce" a ship.

QUESTION: Does the DoD now require a comprehensive risk analysis of a weapon program at major decision milestones? If so, what aspects of a program -- particularly with regard to operational testing -- does it cover? Are risk analyses routinely reported to the Congress when DoD submits its budget request for a weapon system?

ANSWER: Test and evaluation begins as early as possible in the system acquisition process to reduce acquisition risks and to estimate the capability of the system under development to meet all technical and operational requirements. Critical test and evaluation issues (to include all effectiveness and suitability issues), objectives, methodologies, and evaluation criteria are defined during the initial establishment of an acquisition program, and are updated through use of the Test and Evaluation Master Plan. Test and evaluation risk assessments include both developmental and operational concerns, and are based on an analysis of test data and results. These along with other OSD risk assessments are provided to

Defense Acquisition Board principals at the major decision milestones. While these risk analyses are not routinely provided to Congress as elements of the budget request, they are referred to in the test and evaluation portion that documents planned efforts and results.

QUESTION: Does the DOT&E quantify and assess the risks inherent in a program's OT&E plan? How can the Congress ensure that these risks are met?

ANSWER: Title 10 U.S.C. requires that operational testing of a major defense acquisition program may not be conducted until the Director has approved, in writing, the adequacy of the plans for the operational test and evaluation. One tool used in the implementation of that charge is the DOT&E review of the Test and Evaluation Master Plan (TEMP). DoD guidance requires that the TEMP identify and list the critical test resource constraints and limitations, as well as the effect each will have on the usefulness and validity of the test. Consequently, DOT&E initiates an assessment of the risks early in the test planning cycle. As the actual OT&E test plan is developed by the Service(s), DOT&E also assesses the inherent risks in the test approach. These test plans include test objectives, measures of effectiveness, planned operational scenarios, threat simulation, detailed resources, known test limitations, and methods of data gathering, reduction, and analyses. During the development of a test, known limitations are identified. Plans are made to alleviate the known limitations, and test reports include limitations which are expected to impact the evaluation(s).

DOT&E does consider the risks in such areas as test adequacy, realism and schedule. For example, DOT&E has addressed test realism in both written reports and in testimony before the Congress. Limitations and risks with respect to the OT&E of a specific weapon system are also reported, in appropriate levels of detail, in the DOT&E Annual Report, in B-LRIP reports, and in discussions with individual Members of Congress. It clear that the Director does assess risk, and does communicate concerns to the Congress.

QUESTION: The Packard Commission recommended greater use of prototyping as another means to reduce risk before entering production. Could you tell us what has been accomplished under this initiative? Which major programs now in development are using or plan to use system or subsystem prototypes for use in operational testing?

ANSWER: The Department's approach to prototyping, contained in DoD Directive 5000.1, "Major and Non-Major Defense Acquisition Programs", states that prototyping of critical components, subsystems, or systems is encouraged and shall be emphasized to reduce risk. Guidance in DoD Directive 5000.3, "Test and Evaluation", and DoD 5000.3-M-1, "Test and Evaluation Master Plan (TEMP) Guidelines", requires that T&E begin as early as possible in the system acquisition process to reduce acquisition risks and to estimate the capability of the system under development to meet all technical and operational requirements, and to be documented in the TEMP. An integral part of the OSD TEMP review and approval process is assessment of the test community's use of prototypes to meet and adequately support T&E objectives, in particular the validity of the prototype and its associated testing to contribute to viable system capability estimates.

Regarding the use of prototypes for operational testing, illustrative of the systems or subsystems are the torpedos, the ground-based test facility use by the Navy for subsystems, the LRAACA, fixed distribution system, and the prototype approach to ATF aircraft acquisition. Several ECM systems also used prototyping at the subsystem level. It should be noted that in discussing testing of prototype systems, the Packard Commission focused on that testing prior to authorization of full-scale development. Consequently, the focus of such prototype testing is in the development arena.

The **Chairman**. Let me thank all four of you for coming here today and providing us with very, very interesting and helpful testimony.

Thank you very much.

Dr. **Duncan**. Thank you, Mr. Chairman.

[Whereupon, at 12 o'clock noon, the subcommittee was adjourned.]

ICBM MODERNIZATION

House of Representatives, Committee on Armed Services, Procurement and Military Nuclear Systems Subcommittee, and Research and Development Subcommittee, *Washington, DC, Thursday, March 16, 1989.*

The subcommittees met, pursuant to call, at 10 a.m., in room 2118, Rayburn House Office Building, Hon. Les Aspin (chairman of the subcommittee) presiding.

STATEMENT OF HON. LES ASPIN, A REPRESENTATIVE FROM WISCONSIN, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

The **Chairman**. The meeting will come to order.

Today the Procurement and Research and Development Subcommittees are joining together to receive testimony from the Air Force Chief of Staff, General Welch.

I want to thank you for taking the time to be with us this morning, Larry, and to help us with some of the important issues we face.

One of the main topics for discussion is, of course, the problem that has bedeviled this committee, the Congress and indeed the Nation for a decade and a half, that is, what do we do about ICBM modernization. There are more issues involved than just modernization of strategic forces or just the ICBM issue. We would like to discuss all of them with you this morning.

Welcome to the meeting, General.

Prepared Statement of Hon. Les Aspin

Today the Procurement and Research and Development Subcommittees are joining together to receive testimony from Air Force Chief of Staff, General Welch. I want to thank you, Larry, for taking the time to come see us.

The topic for discussion will be a problem that has bedeviled this Committee, the Congress, indeed the Nation for a decade and a half—the modernization of our land-based missiles—ICBMs.

Our discussions are a useful preface to the upcoming decisions on ICBM modernization by President Bush, promised to be conveyed to us by April 3. At the same time, I recognize that General Welch will want to be circumspect to avoid getting out in front of the President's decision. This is certainly understandable. Thus, I view today's hearing as a means of getting some of the essential facts and ideas on the table so that, when the President's decision is in hand, we can fully appreciate its implications.

First, perhaps the Chairman of the R&D Subcommittee or the Ranking Minorities may wish to add something. After this, Larry, you may proceed as you wish.

Prepared Statement of Hon. Robert W. Davis, a Representative from Michigan

Today, we will review one of the most contentious questions that faces the administration and the Congress; namely, the issue of ICBM modernization.

There is no question that we need to continue to modernize our land based missile forces. Unfortunately, at least to date, there has been little or no consensus on how to proceed.

Hopefully, once the administration's ongoing strategic review is completed, we will be in a position to proceed with the needed modernization. Inasmuch as the review is not finished, I am not certain that we will learn anything of the administration's plans.

Nonetheless, I look forward to the testimony.

Let me recognize Bill Dickinson for any comments he would like to make.

STATEMENT OF HON. WILLIAM L. DICKINSON, A REPRESENTATIVE FROM ALABAMA

Mr. DICKINSON. Thank you, Mr. Chairman.

I, too, would like to welcome General Welch.

As the Chairman has pointed out, we have had over a decade of contention. Hopefully this morning we can resolve the issue and strike out on a course that all can support.

As everyone knows, we have built and deployed 50 MX missiles that are in silos. The main objection that everyone voices is that they are vulnerable, since they are at fixed aim points, and the only way you can get around from making any ICBM vulnerable is to make it mobile. For that reason, some have come forward with the idea of the Midgetman that is transported over hardened transporters, et cetera, which we are all familiar with.

The big problem, as you and I have discussed, is money. In our last discussion you said yes, the Midgetman is a desirable system and, in the best of all worlds, if we had the money you would buy both. But if you don't have the money, then you have to make a choice, an election.

I am fairly convinced and have been working toward the end of the rail garrison for the MX that we have in the silos. If we go forward with that, whatever is the follow-on, whether it be a lessened number of Midgetmen or whether it be an additional buy of MXs, we can decide that later, I think.

But I think it is most important, it is imperative, that we make a decision and get on with it.

I realize you must necessarily be in somewhat of a quandary, in that we have a new administration. We will soon have a new Secretary of Defense, who is not on board yet. You must necessarily take some guidance from the administration position as to which course to take. You cannot do this autonomously.

We would like to have your thinking as to what your recommendations might be, how reasonable it would be to go forward with the rail garrison and go forward then with a follow-on of either additional buys of Midgetmen, since we are not buying the full 100 MXs, or with a subsequent buy of the MXs. My personal opinion—but it happens to be right—this Congress is not in the mood to buy a second 50 MXs.

So I notice that the budget which came over has some long lead time money in there for the second buy of MXs. This is sort of a lightning rod that we will have to address in committee, I assume.

But if the Chairman and I can get together and you and the new Secretary of Defense and the Democrats and Republicans, because this is going to have to be a nonpartisan thing—if we can get a concept we agree on, I think it will accrue to the benefit of all of us. I certainly hope we can do that.

Having said that, let me welcome you here again, and I look forward to your comments.

The CHAIRMAN. The Chair recognizes Ron Dellums.

STATEMENT OF HON. RONALD V. DELLUMS, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, RESEARCH AND DEVELOPMENT SUBCOMMITTEE

Mr. DELLUMS. Thank you, Mr. Chairman.

I appreciate the fact that we have established this joint hearing today on the ICBM force. As you are aware, clearly there is a joint jurisdiction here, research as well as procurement.

I agree, this has been a long-term issue. Since the Bush administration is in the process of strategic review, which may not come to us until sometime in April or May, I am not certain how much of a policy statement can be derived from these hearings, but I think it is an excellent opportunity to hear from the witness his perceptions in this area, and perhaps we can engage in some dialog with each other.

With that opening comment, I would join in welcoming General Welch before the subcommittees.

The CHAIRMAN. Thank you.

I welcome both the Ranking Republican and the Chairman of the R&D Subcommittee.

General Welch.

STATEMENT OF GEN. LARRY D. WELCH, CHIEF OF STAFF, DEPARTMENT OF THE AIR FORCE

General WELCH. I appreciate the opportunity to add whatever I can to understanding the strategic nuclear deterrent issues.

There is an ongoing strategic review by the Department of Defense and the administration. When that is completed, the President and the Secretary of Defense will have some difficult choices to make, which will then be transmitted to this committee for your consideration.

Until that is done, as Mr. Dickinson has suggested, I don't have any new Air Force proposals. Nonetheless, I would be pleased to address the issues as I understand them.

I would like to put the issues in just a little bit of perspective, in that I see the strategic nuclear deterrent task as twofold. The first task is to insure that we have day-to-day alert forces that are so visible and so credible that the Soviets could never be tempted to initiate a surprise attack.

Given that a surprise attack occurs, by definition, with our forces in their day-to-day alert posture, if we have repostured our forces it is no longer a surprise attack, in my view.

Given the kind of warning we would expect to have of some crisis around the world, then I think, in the absence of some sort of compelling crisis that would cause us to deploy, I am very comfortable that our current day-to-day forces do provide a compelling deterrent to a surprise attack.

Those forces have significantly improved over this decade, thanks to the support of this committee and the rest of Congress, and they are a very powerful and formidable deterrent force.

Our second task is more difficult—that is the one all these discussions are about—and that is how we maintain that same deterrent in a crisis when pressures for an attack might increase. Consequently, we have set out to build a strategic nuclear deterrent force that can maintain day-to-day alert at minimum cost to be sure it is affordable, 365 days a year, for decades to come. As I indicated, I am satisfied that we are well on track with that part of it.

That force also needs to be capable of rapidly expanding its deterrent capability in crisis, so that the increased deterrent power always stays ahead of those pressures to attack that might grow out of a crisis.

Our objective is to build an aggregate within the triad of forces that provides minimum cost, day-to-day deterrence and is capable of expanding in crisis in order to increase that level of deterrence. At the same time, in the aggregate, the triad of forces has to be very robust in the face of possible Soviet technical developments.

I suppose the last requirement I would mention, not that it is the least important, is that this triad of forces does have to lend itself to arms control negotiation.

I believe we have indeed embarked on building an aggregate triad force that meets all of those requirements.

With that, I would welcome questions and discussion, Mr. Chairman.

The CHAIRMAN. Thank you, General Welch.

Let me start with some questions and see if we can get on to other comments that the other Members might make.

First of all, let me echo what Bill Dickinson said. There is a way to solve this problem politically this year. As we all know and as those of us who have been trying to get the Scowcroft Commission recommendations adopted, sticking with any deal over time is enormously difficult to do. But I do think there is an opportunity here to do something about this problem and I think a compromise is at hand.

What we do have to realize is that the short-term funding is a real problem. By "short-term," I mean the 1991 to 1994 time frame. You cannot go ahead with Midgetman, rail MX, Stealth, all on the current schedule and have the kind of funding in that time frame to cover them. It is going to require some sequencing, consultation, some give and take on all sides. But I do think that the elements of a compromise and the elements of a strategic program are there.

I would echo Bill Dickinson's comment about the MXs. I think the 50 is all there is. To reopen that can of worms is just unbelievable. I mean, there was blood on the floor of the Congress over that issue—a good amount of it mine, I might add—on the MX. It was a fight between those of us who wanted the 100 the Scowcroft Commission called for and those who wanted none. The Congress finally agreed—pro-MX, Democrats, Republicans, House and Senate—on a compromise of 50 in 1986.

Ever since that, the MX has disappeared off the screen. That was a "done deal." The administration never signed up to that. Nobody in the Administration is under any obligation to that. They never signed up. They kept insisting they are still looking for 100, as indeed the Carlucci budget does indicate. It is just that that is an issue that is an awful mess, to open that package again.

I do believe if there is a cap on the 50, that you can get rail MX for the 50 we are talking about.

I do believe that another element of the compromise is that you have to have some Midgetmen in there—more to be talked about in terms of the compromise, eventually I think there is something to be done there.

Let me ask your reaction to a couple of things, in particular, the issue of going beyond the 50 MXs.

The money in the Carlucci budget—I don't know what it will be in the budget as it comes down through the tube to get it through the zero real.

How strongly do you feel about 50 MXs?

General WELCH. I would like to put that in context.

I understand politically you cannot separate those issues, but programmatically and operationally you can. If you were to separate those two issues, I think almost everyone would agree that we would rather have those first 50 Peacekeepers that exist today, that are not an issue—almost everybody would agree we would rather have those on the rails than in the silos. I think almost everyone would agree that it is worth the $5.6 billion in 1989 dollars required to do that.

The problem with stopping there, of course, is that that is no new warheads. That is rebasing existing warheads.

Then we come to the issue of how we build the next 300 to 500 warheads to give us the level of these high quality warheads that we need.

The Air Force issue is very straightforward. The President's Budget includes additional Peacekeepers and rail garrison, although that money is fungible, as you well know. We arrived at that position solely on budgetary considerations. We supported additional Peacekeepers and Small ICBM until an additional $42 billion fell out of our budget. So let's talk about the next 500 or 300 high quality warheads.

Quite frankly, in terms of the warheads, there is very little difference between the Peacekeeper and the Small ICBM warheads. The Peacekeeper is a little more accurate, but the other is larger. There is very little difference in operational quality.

We can buy a second 500 Peacekeeper warheads for $9.1 billion in 1989 dollars, cost to complete, or we can buy a second 500 Small ICBM warheads for $24.8 million, 1989 dollars, cost to complete. I think what the committee and the Government have to face is the difference between those two.

I freely admit, and always have, that Peacekeeper Rail Garrison requires that the President respond in a crisis to make them survivable. If the President would not respond, they would not be survivable, while the Small ICBM requires no such decision. It is operationally more flexible and somewhat more resilient to Soviet countermeasures.

What the committee has to weigh is whether or not those operational advantages one gets from the Small ICBM is worth the difference in cost.

The Air Force is dealing with the Air Force budget, and when we have to deal with the Air Force budget we have to opt for the lower cost option and accept the operational difference between the two. We would prefer to have both, but you cannot do it with the budget we are dealing with today, which is lower than the budget we had earlier when we made the decision that we could not afford both systems.

I think if you search the testimony and every comment made by both General Chain and me, you will never see anything but admiration for the Small ICBM. It is a budget choice.

The CHAIRMAN. I think that is correct. I have never noted that you or General Chain or any others who speak for the Air Force have ever said anything about the Midgetman, that they did not want the weapon. It was just a question of the cost.

I would also add that another operational advantage of the Midgetman that General Chain mentioned, which is its ability with a single warhead that gives you some targeting flexibility. It is nice to have single warhead weapons, depending on what scenario you are being required to use them in.

A ten-warhead missile kind of limits the time you can use it, because if you don't have ten targets—in other words, there may be certain scenarios where a single warhead missile would be very useful. Having a survivable single warhead missile, given the fact that none of the SLBMs have it, and the Minuteman II is in silos, that is another advantage.

Let me ask your opinion of a carry-hard idea that has also been proposed as a possible solution to the survivability of the land-based missiles.

General WELCH. There are two things I would say about the carry-hard notion. That is one of about 38 different modes we have restudied recently. There are some operational questions about carry-hard.

Quite frankly, we have not delved into the operational questions very deeply because I think the cost of carry-hard speaks for itself.

For example, I mentioned $24.8 billion to deploy 500 Small ICBMs on road mobile, which has all the operational advantages. To do the same with the others would cost on the order of $40 billion. I can't imagine why we would want to spend 60 percent more for a deployment mode that is not nearly as satisfactory operationally and is not nearly as high confidence in terms of its ability to withstand Soviet countermeasures.

So carry-hard has some terrible problems, technical questions, but the real crippling problem with carry-hard is that it costs 60 percent more.

The CHAIRMAN. Let me ask you a little about the choices on Midgetman as between the southwest basing and the Minuteman sites.

General WELCH. That is kind of a non-issue with us, Mr. Chairman, in that all the work on the Small ICBM has been predicated on being perfectly capable of either deployment—that is, deploying it at Minuteman sites or southwest basing. As long as the threat permits basing on Minuteman sites, then the advantage is lower cost, and we obviously are trying to drive the cost down to the lowest possible cost.

If we were to proceed with Small ICBMs this year with no more obstacles, then the IOC is either 94 or 95, depending on how optimistic you are, and all the work we would do would permit basing in either area, our recommendation would be to stay with the Minuteman basing because we piggyback on the Minuteman support base and we don't have to spend money for a new support base.

It is our understanding that anytime we see an active threat developing to Minuteman basing that would make us nervous in terms of being able to respond, we need only build support facilities to rebase it in the southwest. It is a non-issue.

The command and control system, hardware, whole concepts permit either basing mode. We don't want to incur the operating costs until we have to.

The CHAIRMAN. Let me go to the question of paying for all of this.

We sent you a little paper that I had done with people on the staff on how you might make all these programs fit over a 10-year period. I think what it shows is that you can do both a Midgetman and a rail MX if you don't do them both at once; in other words, you sequence them, and, second, you make other adjustments in strategic programs.

I would like your reaction to it, both from the standpoint of does it track with your numbers on this thing, and what do you think about the various adjustments in the strategic programs that would need to be made to make them both fit, and what do you think about the sequencing?

General WELCH. Let me talk about adjustments to strategic programs.

There was a suggestion—I don't recall exactly how it was put forward—that we might fence strategic funding and have a certain long-term level to allow us to pay for all of this. I certainly agree that it would.

My difficulty is that we have not been able to fence strategic funding in meeting our 1990 burden.

As you know, the Air Force's share of the reduction from the Reagan budget to the Bush budget for 1990 through 1994 is $20 billion across that time period. In order to pay that price, the Air Force has found it necessary to make significant changes to the B-2 program.

Now, whether or not OSD will accept all those changes is yet to be determined, but the Air Force recommendation makes very significant changes.

The CHAIRMAN. You are saying in coming from the Carlucci budget for 1990 to the Bush budget for 1990, the allocations are being done by the service? Is that what you are saying, the Air Force is getting a certain part of that cut? They are not saying anything about whether to take it out of strategic or conventional or where, they are just saying to the Air Force, find X number of dollars worth of cuts? Is that what you mean?

General WELCH. That is part of the process that comes later.

The beginning of the process is, Air Force, here is your share of this reduction that we want you to present to the DRB. It is just a discipline measure. It forces people to face up to the facts of life. Then the actual decisions about which of those are accepted and what the balance is between strategic and conventional forces takes place in the DRB.

The very fact that the B-2 represents about 8.5 percent of the Air Force budget in the next 5 years tells you that, in a budget cut of this magnitude, you are going to have to do something to that program.

Anyway, that was the first point, that the strategic pockets are not sacred. We had to dig into the strategic pocket.

The CHAIRMAN. They are not sacred now. They could be sacred if we sold this idea to the new Secretary of Defense, right?

General WELCH. For as long as the new Secretary of Defense lasts, yes, sir, or any of the rest of us that sign up to this agreement.

But we took it out of the strategic pocket because we would otherwise have had to do violence to conventional forces. That is not to say we cannot pay for a combination.

Let me get to the sequencing. Our strong urging would be that the lowest cost way to buy these systems is to buy them on their own independent flow, that is, to let them flow at a rate that makes programmatic and economic sense, and then see if that creates a financial burden that you cannot stand.

If you let them flow on what makes sense for that program with no consideration of the other program, that is, if you let rail garrison, rebasing proceed, that would reach an IOC in 1992 and FOC in 1994, that probably is 50 missiles rebased. If you stretch that, it costs more money. It saves you money each year but costs you more money overall, so you don't want to do that unless the overall price forces you to.

If you make the same assumptions about Small ICBM, that is, if you flow the program on the schedule that makes programmatic sense for that missile, then the IOC is 1994 or 1995—currently 1995, but could be pulled forward to 1994. The FOC depends entirely on the buy rate, because you are buying significant numbers of them.

If you were to put those two together and say you flowed both of those programs on their own programmatic schedule, which is the most efficient way to buy both of them, then the cost in 1989 is just a little more than is currently in the overall ICBM line.

If that ICBM line was totally fungible and we did not have some language that prevented us from moving the money around as we ordinarily would be able to, then the 1989 dollars are just about there, maybe short something less than $50 million to do both in 1989 at their own pace. The dollars in the 1990 budget that you have seen are about $50 million short. That is if you just take the total ICBM dollars, some of them are in there for the second 50.

If you apply all those dollars across those programs, we are about $50 million short in 1990. In 1991 we are about $70 million short. Then in 1992 you really begin to run into a funding problem. In 1992 we are about $500 million short of being able to do both of those together, and in 1993, roughly $1.5 billion, and in 1994 a couple of billion dollars, so we are talking about a $4 billion shortage over what is currently in the budget that we submitted to OSD.

So if indeed we were to decide that you wanted to proceed with both of those and we could not find that kind of money in 1993, 1994, then we will have to do some adjusting.

But it is not in the category of a $30 billion problem.

The CHAIRMAN. Let me pursue this a little bit.

This problem you laid out comes if you proceed with—tell me again how you would proceed with the program, proceeding with the MX according to the current schedule.

General WELCH. We would proceed according to the Peacekeeper schedule, as if there were no Small ICBM—and the Small ICBM schedule would proceed as if there were no other considerations, just that program.

The CHAIRMAN. Now, when you say you are $50 million over in 1990 and then eventually big numbers up to $2 billion a year, what are you using for the baseline, over what, over a constant share of the strategic budget for ICBMs, or what is the constant?

General WELCH. Over what you see in the current 1990 budget.

The CHAIRMAN. The current 1990 budget that you see for ICBMs?

General WELCH. Yes.

The CHAIRMAN. Then you would be assuming that is all you are going to get. You are assuming a flat budget program for the purpose of this exercise.

General WELCH. I simply compared it to what you have seen. I did not make an assumption.

The CHAIRMAN. As we have all known, the crunch years come 1992, 1993, 1994. If you get by that lump, things look easier. But we have it all jammed into those 3 years.

What is the magnitude of the problem over those 3 years?

General WELCH. For the example I gave you, approximately $500 million in 1992, $1.5 billion in 1993 and $2 billion in 1994.

The CHAIRMAN. A total $4 billion problem over 3 years?

General WELCH. Approximately.

The CHAIRMAN. You are talking about various things that might be done to pay for it if you wanted to go to a two-missile program.

Mr. DICKINSON. May I clarify something?

The CHAIRMAN. Surely.

Mr. DICKINSON. The figures you just gave us as to the shortfall are based on what we are projecting now into the 1990 budget and outward based on what?

General WELCH. Based on the 1990 budget that you have in your hand right now.

Mr. DICKINSON. But we are projecting what sort of a spending level in the outyears? How do you arrive at that?

You have to guess what the budget will be, like a 2 percent growth or flat spending or what?

General WELCH. You are talking beyond 1995?

Mr. DICKINSON. No. I am talking about between 1992 and 1995, the big crunch years we are talking about. They have to be over something.

The Chairman asked you what the baseline was. You have to project that against the anticipated budget, I think. I was wondering what you used for the budget.

The CHAIRMAN. Let me ask it a different way.

Are you doing this off the Carlucci budget or the zero real budget?

General **Welch**. In this line it is the same. In this line, when the Air Force made the adjustments to the Reagan budget in order to meet President Bush's new guidance, we did not change the ICBM line. So it is the same line.

We did not change the ICBM line because the President has not made a new decision. It would be totally inappropriate for us to fiddle around with that line until we get a new decision. So it is the same.

The **Chairman**. Let me raise the question about ways you might pay for going over that ICBM line.

The candidates are: stretching the B-2, doing something about the current forces so you save operating funds, bringing down some current forces in anticipation of a START agreement to save some operating funds, or flatten out the SDI budget—in other words, if you flatten the SDI budget, as opposed to letting the increase in the program that Carlucci had.

General **Welch**. As you know, the President has not made a decision on the SDI budget either. Let me take those from top to bottom.

As I suggested earlier, the Air Force has done all the violence to the B-2 program that we think can prudently be done in paying the bills we have already had to deal with. That is a considerable modification of the B-2 program.

Now, slowing down the B-2 program a little on the front end is a good idea, because after all the first flight has slipped. That is no secret. So slowing down on the front end is a programmatically good idea.

But slowing them down on the other end is not a good idea. There is nothing more in that pocket, in my view, that you can take out without doing terrible things to that very important program.

The **Chairman**. You are assuming that there is no more delay for engineering reasons. It is always possible that you will get another 6 months' delay or even more. Every time we turned around the first flight has been postponed. You may get a windfall out of it.

I am not saying that—you are right, we should not postpone or stretch out for economic reasons, but you may get something from it just because the technology—it is a complicated plane and you don't want to rush it.

General **Welch**. We always try to put the best face on things when we are forced to do something we don't want to do.

Some delay on the front end is a good idea, but the delays we have introduced into this program will more than accommodate the wildest pessimist with regard to what needs to be done to accommodate the engineering on the airplane. We have gone far beyond that in our recommendation.

Again, I hasten to add, the Secretary of Defense has not accepted or rejected our recommendation. But if he has a lot of money to add to it that we don't know about, we will be just elated.

The other issues of where you would go to get the money, I don't know of any other place to go but conventional forces. SDI is an issue beyond my control until the President makes a decision. The current SDI program direction is much more conservative in terms of program pace than it was 2 or 3 years ago.

The CHAIRMAN. Mr. Dickinson.

Mr. DICKINSON. Thank you, Mr. Chairman.

I think, General Welch, you answered most of the questions I was going to ask, particularly your idea of the sequencing of it. I guess if the money that is anticipated is not there, then that would have a further impact on how you would sequence, I would assume. It would be your plan to go forward with the most promising IOC and the least glitches in the program as of now and hopefully we can address the impact later.

There are two things I would like to ask.

Have your calculations and your recommendations taken into account and, if so, with what regard to the potential of sequestration this year? What would that do to you, other than what you have proposed to us?

General WELCH. The nature of sequestration is that it affects all programs. To relate that to the ICBM programs is that we need to keep the rail garrison program on track. The numbers are the same, whether you rebase the first 50 or deploy additional, because we are talking about rail garrison development. It is independent of that fact. Beyond 1 April we have to have about $60 million per month to keep that program on track.

Mr. DICKINSON. Rail garrison?

General WELCH. That is the rail garrison. It takes about $60 million a month. If we sequester, you have to have $60 million, plus 10 percent, and it has to come from someplace else.

The Small ICBM is a little bit of a different story in that there is no money in the President's Budget beyond September 1989 for the Small ICBM. As I mentioned earlier, there is almost enough money in the overall ICBM line, if we were free to move it around, to do that. But if we take 10 percent of that money out, then we are short another couple of hundred million dollars.

So sequestration just complicates the problem.

Mr. DICKINSON. Yes, I am sure it does. I had not even thought about this.

When we were going through the drill of how we were going to apportion the money for the two programs, we said, well, $250 million will go for the first bite of the MX rail garrison and $250 million over here for the Midgetman and then we put the balance of $350 million and let the administration make that decision.

Now, the administration has not geared up yet, so they want again another 60 days. When you say that you would like the flexibility, I don't know if we made any accommodation for the next administration to split that money.

Did we?

The CHAIRMAN. Yes.

Mr. DICKINSON. They did split it?

The CHAIRMAN. They would have to do whatever they are doing. I think it was reprogrammings. They could split it. They have lots of flexibility.

General WELCH. The flexibility is there. When the President makes his decision, he announces it to us.

Mr. DICKINSON. In order to help us realize the level of pain you have already experienced in dealing with the budget, give us some idea of the things you had to change, slip or drop out to accommodate the numbers you had to work with, if it doesn't even get smaller, such as the slippage of the B-2, mothballing the SR-71—I am sure there are a few other things that were hard decisions for you.

We would have a better appreciation of the problem if you can tell us some of your problems. These things have given us problems, too, but we realize they are forced only by the budget.

General WELCH. Again, with the caveat that the Secretary of Defense has not decided on any of this, the Air Force philosophy in approaching it was that we took very significant force structure cuts over the past 3 years. We have over the past 3 years cut 37,000 people and 31 combat squadrons out of the Air Force. We did that to cope with past budget reductions because we are convinced we would rather have a smaller, high-quality ready force than to try to maintain all that force structure. That puts us in a position where we have no interest in further reductions in force structure, because we have done that. We have reduced in past years sustainability considerably, because intentions would indicate that is reasonably low risk right now.

We insist that we not reduce readiness. There is a difference between readiness and sustainability. Readiness keeps the airplanes and people working in good condition today. Sustainability is what keeps you fighting for weeks, months, et cetera.

That leaves the Air Force really no place to go to get that kind of money.

We talk about early retirement of the B-52 squadron, for example. That doesn't even make a dent when you are trying to find $20 billion.

The only place the Air Force can go to find that kind of money is the major acquisition programs. If you go down the list of Air Force acquisition programs and take the top six spenders, you will find that is where we went to find the money: B-2, C-17, F-15, F-16, MILSTAR and ATF. Those are our top spenders, and that is where we have to go to find the money. Any other approach decimates dozens and dozens of additional programs.

We had a twofold philosophy: It had to come out of modernization and we didn't want to do anything that does long-term damage to our future capabilities. So that means stretching. Stretching costs money. Stretching is very painful. But you are going to have those capabilities out in the future, although it will take longer to get them and it will cost the taxpayer more money than we had hoped it would, but at least we will have those capabilities out in the future when we have to have them.

Mr. DICKINSON. Thank you. I think that gives us a better snapshot of your problem.

The CHAIRMAN. Mr. Dellums.

Mr. DELLUMS. Mr. Chairman, as you indicated in your opening statement, this hearing this morning is to address the issue of modernization of our ICBM force. Thus far this morning there has been some discussion of political balance and some discussion of cost considerations.

I would like to take us back to a much more fundamental level, and that is to address the assumptions upon which these hearings are established, and that is the need for or lack thereof of modernization of the ICBM force.

Therefore, rather than pursue cost considerations—which I think are extraordinarily important, given the imperative of budget deficits, mounting social problems and the need to develop adequate foreign and defense policy—understanding those imperatives and understanding the need for cost considerations, I think we need to go back and address the policy issue and address the conceptual support base for whether or not we ought to pursue modernization for our ICBM force.

I have a question which I would like to set up by going back to the comment that the Chairman of the full committee alluded to in his opening remarks when he said the issue of modernization of the ICBM force is a debate that has gone forward for well over a decade.

I know this gentleman was involved in the debate in the 1976-77 time frame when we came out in opposition to the MX missile. As I recall the nature of the debate that brings us to this moment calling for modernization, the argument was that our land-based missiles, by virtue of their fixed-based mode, would be vulnerable to Soviet attack by the mid to late 1980s. I might add that we are now in the late 1980s and we have not sustained an attack on the ICBM force thus far, and I see no immediate threat in that regard.

However, those persons who advocated the analysis that our ICBM land-based missiles were vulnerable to Soviet attack then began to pursue a solution to the problem—I might add, attempting to fashion a solution that in my humble opinion was to a problem that did not exist.

But they said, well, if we can find a mobile mode to place these fixed-base missiles in, that would increase the survivability and therefore reduce the vulnerability of our land-based missiles. They began a long journey in an attempt to find a mobile mode for our land-based missiles. We came up with a variety of different ways to deploy the MX in a mobile mode.

I found it fascinating that in the early days of the Reagan administration he established the Scowcroft Commission. The Scowcroft Commission labored long and hard and came to the conclusion that we should deploy MX missiles in existing Minuteman silos.

Then a number of people said, wait a minute, you are deploying ICBM missiles in fixed-based Minuteman silos, so aren't they vulnerable. The Scowcroft Commission said the Soviet planner must take into consideration the aggregate of our triad, they are coming up with the concept of synergism, which says the Soviet planner cannot in good confidence attack one leg of our nuclear triad because we would have a number of surviving nuclear missiles that would inflict extraordinary damage upon the Soviet Union, therefore deterrence.

Now, my question is this. If synergism was advanced by the Scowcroft Commission—we advanced that argument in 1977, but in 1977 it was a radical idea and the Scowcroft Commission was a responsible and competent response to the set of issues.

If the Scowcroft Commission, responding to the issue of vulnerability, raised the question of synergism as a deterrent response, why is not synergism still a relevant and reliable concept?

We are now talking about further support for MX missiles on rail garrison. We are talking now about small mobile missiles. But if the issue of synergism was real then, why is it not real now?

I would state, perhaps as the most telling support for the thrust of the question I make, that this is now the late 1980s and the planner said that our land-based missiles would be vulnerable, they are not in a mobile mode at this time, and I see no vulnerability.

If that is the case, why should we pursue an exhaustive and expensive journey toward very expensive mobile missiles when perhaps the better part of valor is to proceed in an arms control fashion to rid ourselves of these heinous weapons.

General WELCH. First, the answer to your question of synergism is that it is alive and well and operating.

Mr. DELLUMS. So my question is: Would synergism still not be a relevant response, thwarting the need for any weapon system, rail garrison or Small ICBM?

General WELCH. What we are dealing with is deterrence. Deterrence is in the minds of the Soviets and the minds of the U.S. decision-makers. It is certainly very clear to me that there are a great many people who are in decision-making positions in the United States Government, and over a period of two administrations, who are uncomfortable with the vulnerability of land-based missiles as they sit in their silos.

You can make the argument—and it is a valid argument—that if you look at that from the viewpoint of the Soviet decision-maker, that all of those missiles sitting in their silos represent a prompt retaliatory response capability and the Soviet decision-maker must account for that in all of his calculations. He cannot know how the President would respond. I don't know how the President would respond. It is inappropriate for me to speculate on how the President would respond. So I believe that those missiles have a powerful deterrent effect in the silos.

However, I also agree that those missiles in the silos do tend to contribute to a hair-trigger mentality. There are a great many people in this Government who are uncomfortable with the hair-trigger nature of missiles in silos, the "use them or lose them" kind of scenario. While I don't necessarily subscribe to all those fears, it is not me who has to be convinced. It is the President and the Secretary of Defense and other people, and they have made their decision.

The Congress has told the U.S. Air Force and the Department of Defense in the clearest possible language that they don't want any more missiles in silos, that they want those missiles—and in fact the law says that we have to find either a deceptive or mobile mode to deploy any additional land-based ICBMs. That is a fairly solid expression of this concern that is leading us to want to take those missiles out of there.

They are clearly vulnerable. There is no question. If the Soviets made the decision today to attack those missiles in the silos, then they could attack and destroy—if the missiles remained in the silos, they could attack and destroy them.

So clearly they are vulnerable. What makes them not vulnerable is the Soviets are deterred. I agree. We have been successful in deterring the Soviets because of the synergism with the Triad of strategic nuclear weapons, a very happy event.

Mr. DELLUMS. General, I appreciate your response.

Let me just say that the difficulty with the argument is that the argument becomes very convenient. You can't argue on the one hand they are vulnerable and argue on the other hand they are not vulnerable, because vulnerability is not something that you pursue as an abstraction. If we did not have two other legs of our nuclear Triad, much, if not most of them, in surviving mode—certainly our submarine capability is extraordinary. You can't then look at what synergism said was you can look at one leg of our nuclear Triad in a vacuum, that the planner must look at the totality of our nuclear forces.

Deterrence does not derive from whether one particular leg of the Triad is survivable in and of itself, but whether it is survivable in the context of the totality of our nuclear forces. That is what the principle of synergism is all about.

Mr. Chairman, members of the committee, what my argument is is this. At a time of incredible budget austerity, at a time when war is taking place in the cities of our country, where a number of our young children are dying in incredible numbers—not only in Washington, D.C., but every metropolitan area in the country—we are now pursuing an expensive course to attempt to solve a problem that does not exist.

I appreciate the arguments about political balance. I appreciate the arguments that, if we don't buy this many MXs, maybe we can buy a few of the Minuteman. But we are not coming back to the basic policy consideration that I think is our responsibility as members of the United States Congress. This administration may have decided we don't want any more missiles in silos, but how can you argue we don't want any more missiles in fixed based mode when the concept of synergism is, as the General said, alive and well?

My argument is not with the General. The General is not here to establish policy, he is here to report policy. What I am challenging is not the General, I am challenging the basic assumption that drives the need for two very expensive weapon systems.

Finally, I would say this. I was struck, Mr. Chairman—the General didn't respond to you—I was struck by your comments with respect to the Midgetman because the argument that I have heard from the supporters of—at least some of the supporters of Midgetman—was that it is an arms control weapon by virtue of the fact it has a single warhead. But I have never heard any discussion of the Midgetman when you indicated that there may be some scenarios that a single warhead would want to be triggered rather than ten warheads, because now we are moving into the very dangerous area of discussing the war fighting strategies, and I would suggest that we are still operating, as I understand it, at least publicly, with a deterrent rather than war fighting policy.

One of my arguments has been that we are moving away from deterrence to the development of a nuclear war fighting capability, and that disturbs me. Any discussion of war fighting scenarios takes us far beyond deterrence, and I think if we stay within the principle of deterrence synergism works and if synergism works, there is no need to attempt to solve a problem where there is no problem.

The CHAIRMAN. If the gentleman would yield, let me just respond a little to the point about the single warhead. As we know, deterrence is made up of a lot of different factors, but the main thing is the difference between a credible deterrent and a stable deterrent.

The issue of a single warhead missile being used is more likely and therefore it adds to the credibility of the deterrent. It is an old argument. There is no way we are going to resolve it here.

Mr. DELLUMS. If the gentleman would yield briefly.

Number one, it has to be resolved someplace, whether it is here, whether it is on the floor, whether it is between us and the White House.

The matter needs to be resolved. The only other response I would make, as I said, the most telling mode of deterrence is working and we have not deployed a mobile land based missile system. Why are we attempting to fix something for which there is no problem? No one is willing to answer that question.

We talk about moving out of fixed base silos in an abstract discussion but no one comes to the reality that deterrence is at this moment working, as synergism is, as the General said, alive and well. What kills it that makes us need to go to mobile?

The CHAIRMAN. The General is the witness. Because you mentioned something that I raised, let me just state my position on the issue, which is that number one, in order for deterrence to work it has to not only be stable and be a massive deterrent, but it has to have credibility. To have credibility you need to have the capability to do less than all out attack. A single warhead attack is more credible. It adds to credibility.

On the point of synergism, I will say synergism is alive and well. Synergism is threatened by three developments.:

One, more accurate Soviet SLBMs.

Two, depressed trajectory SLBMs.

Number three, stealth cruise missiles on the Soviet side.

If the Soviets develop any of those—the latter two really, the first one partially—synergism goes out the window.

So, yes, synergism is alive and well for now but we plan our forces on future Soviet developments and we are never sure how it is going to play.

General Welch, you are the witness, not me.

General WELCH. You explained that at least as well as I could.

I think the principal issue, Congressman Dellums, is stability in crisis. In deterring a strategic nuclear attack in a normal situation is something we are very comfortable with simply because those are normal times. There isn't any reason why you would expect the Soviets to do anything as irrational in normal times as to launch an attack against the United States. But it is input, not output, and it depends on how the Soviets feel about deterrence. I think in normal times all of us can feel very comfortable about all this.

Our problem is stability in crisis. I won't try to define the crisis. It could be internal in the Soviet Union, it could be a conventional war in Europe. It could be any number of things. Stability in crisis dealing with that and ensuring that you can increase the deterrent effect and that you are not tempted to do something in a hair trigger fashion, you are always better off if more of your strategic nuclear forces are survivable and flexible, so that you simply don't feel the pressures or the decision maker doesn't feel the pressures for too rapid a response. You want to be responsive but we really are uncomfortable with the hair trigger response.

What you get out of survivability is increased stability in crisis. I am convinced this country needs a mobile land based ICBM because of that.

Mr. DELLUMS. I thank you, General.

I say, Mr. Chairman, thank you for your generosity. I do think that the three points you made can be responded to very effectively. I will do so in another forum.

The CHAIRMAN. It is a good debate we ought to have and we will look forward to it. The problem is we have got General Welch here. We ought to give him a chance.

Mr. DELLUMS. That is why I said we will have at that in another forum.

The CHAIRMAN. Mr. Hopkins.

Mr. HOPKINS. Thank you, Mr. Chairman.

I was enjoying the debate between you and Mr. Dellums but as you have indicated, since the General is our guest here today, I will direct my questions to him. Following up on some of the things Mr. Dellums was saying, General, let me ask you how many basing modes have we considered for MX?

General WELCH. You have got me. We have recently reviewed 28.

Mr. HOPKINS. Twenty-eight.

General WELCH. Twenty-eight. Now, how many have there been over the years, I really can't remember.

Mr. HOPKINS. The reason I am asking the question, Mr. Dellums brought up the latter in the 1970s and that——

Mr. DELLUMS. I have seen over 30 here.

Mr. HOPKINS. We were involved in a political campaign, first Mr. Carter and Mr. Reagan, and the issue of MX came up. The issue at that time was again another rail, if you will. Mr. Carter's proposal was to put MX on the railroads, as you recall, between a couple of States, and it became a political issue, and Mr. Reagan, claiming that this was not the correct thing to do, and made a big issue out of that.

I have to tell you that in the years that I have been on this committee and sitting through all of that episode also, I haven't seen a better basing mode than the one Mr. Carter proposed in the seventies. It became a political issue and the 28 or 30 or whatever we have had since then, including dense pack.

Is this rail garrison, is that the big enchilada? Is that the main one now? Is this going to be it for us?

General WELCH. That is the only one we are considering. You know, you characterized—by the way, I was perfectly content with MPS but while I think you could characterize the problem as political, it is political because of the environment. So there was a serious issue. We did have very serious environmental objections from people that were going to be the host for that system. We do have to consider those.

But yes, rail garrison is the only deployment mode for Peacekeeper that we are interested in.

Mr. HOPKINS. Well, this committee—money has been brought up. It is an obvious problem that we have. This committee is riding to some degree, if you will, riding the Midgetman or the small missile and the MX missile and throwing money on both sides as it goes down the track, and that is a problem. Now, as an expert—and I know where I think you are going to come down on this, but I think just for the record—I would like to have two cars but I can't afford but one.

If this country can only afford one system, which should it be? I am asking you as the expert here this morning. Which should it be if it really falls down, in the best interest of this country? Which system should we have?

General WELCH. There is a massive difference in the affordability of the two systems, so if it is an affordability issue you must always choose rail garrison.

I personally am content with a system that requires the President to make a decision in a crisis to deploy it on the rails. That is the drawback to rail garrison. I don't have a problem with that. So consequently, if it is an affordability issue you must always choose rail garrison. You will get the high quality warheads that can be made survivable based on only a decision for less than a third of the price. So I think that it speaks for itself.

Mr. HOPKINS. Let me ask you this: When the public—if it is the decision that they go with rail garrison and that is what the country ends up with, what do you think will happen when the public really becomes aware that these nuclear armed missiles are going to be rolling over commercial rail lines throughout the Midwest? Do you have concern that there might be laws or regulations passed that are going to restrict the flexibility of deployment?

Because once flexibility to deploy is limited, then the survivability of the system is going to be reduced. Would that not be correct?

General WELCH. I really don't have very much concern about our ability to respond in crisis. The reason we went to rail garrison rather than just plain rail mobile, we considered rail mobile in the 28 or 30 or 35 or however many modes there were under consideration a long time ago. Rail mobile has long been our favored approach. You will note the Soviets have deployed a similar rail mobile in the Soviet Union. So it is eminently doable. It is technically a piece of cake. You can hide them so it has all of those operational advantages.

Quite frankly, we went to rail garrison because we were concerned about day after day, week after week, month after month, public interface on the public railroads. We decided we didn't need that kind of day after day, week after week interface because in normal times there is no need for those missiles to be out on the rails. So what we are really asking is do we think the American public will tolerate actions to make the strategic nuclear deterrent more survivable in a crisis situation? My answer is I am quite confident they will.

Mr. HOPKINS. Thank you very much, General.

The CHAIRMAN. John Kyl.

Mr. KYL. Thank you very much, Mr. Chairman.

General Welch, I want to see if I have this straight. The first thing you have to contend with is approximately $20 billion, give or take, from the Reagan-Carlucci budget to the Bush budget. You have already made significant cuts, as you testified, to 31 squadrons and 37,000 people. You testified that the B-2 has already been stretched beyond what is really prudent and I got this quotation down.

That leaves the Air Force, you said, no where to go to get that kind of money—referring to the $20 billion. The result was the necessity of stretching out some acquisition programs that have the effect of modernizing our forces.

I note the Chairman's terminology sequencing. Let me use the word stretch for the time being. You said stretching costs taxpayers money. I think that is something that we here ought not to lose sight of, as we consider modernizing our strategic force. The acquisition programs that would be stretched—you identified five or six—the Milstar, B-2, and others, so we have the problem with the first $20 billion.

What is being suggested in the nature of a compromise here, which has been justified on the basis of politics rather than strategic considerations, is that we super-imposed another approximately $17 billion in 1989 dollars for the increased costs that would be associated with the Small ICBM program.

The way I get the $17 billion—I would like to ask you to correct me if I am wrong—is that to buy a thousand Peacekeeper warheads on rail garrison in 1989 dollars is approximately a total cost of $12 billion. The cost of 500 Peacekeeper rail garrison, plus 500 Small ICBM would be somewhere in the $28 to 29 billion range.

You would add the $5 billion increased cost for rail garrison Peacekeeper and $23 plus billion for the Small ICBM. If you then subtract the $12 billion from the $29 billion, you get approximately $17 billion in extra costs as a result of the decision to compromise for political reasons to develop a combination of rail garrison and Small ICBM, the $17 billion being the cost of the Small ICBM.

The Chairman then cited through possible sources to get this funding from. Obviously the question is where are you going to get the money? Four billion over the first 4 years of the programming the initial big crunch, he cited three programs, the B-2, which you already said can't sustain any more stretching responsibly.

You already noted the cuts there and indicated you didn't know where you could cut additionally there.

Third, SDI. Total budget of SDI is only a little over $4 billion, so even if you are talking about taking a few hundred million off of that base line, you are obviously not talking about big money by Washington standards.

My question, therefore, is considering this $4 billion 4 year crunch, the $20 billion you have to deal with, not even talking about negative funding wedge over the next several decades associated with the remainder of that $17 billion, it still hasn't been answered, where are we going to get the money?

General WELCH. Is that my question?

Mr. KYL. Yes. I would hope that if this political decision is forced upon you—and I recognize your first priority is to be sure those 50 Peacekeepers can get rail garrison. That is the number one consideration and I think almost all of us agree with that. But hopefully, you would be and the Air Force would be making this decision rather than the people up here. So that decision would still come back to you.

If we force upon you the Small ICBM decision, what kind of harm is it going to do to our program, and where would it come from?

General WELCH. I don't know where we would get the $4 billion. If the President were to decide that he wants to proceed with both, then we go back to the drawing board and we get the $4 billion. It would be with greater pain than I have already described, but I really can't telegraph where we would get that because I don't know.

That is not the way we do budgeting, but let me be sure that everything is in context. That is, I think we need a mobile land based ICBM. I feel very strongly that stability in crisis is very well served with a land based mobile ICBM.

There are operational advantages to the Small ICBM. There have always been operational advantages to that. The issue of the choice between rail garrison and small ICBM hinges on these two factors we have already discussed.

Let me say this. I have had my day in court all over town. I have not found anybody that refuses to listen to what are our very logical arguments for why rail garrison is OK. So I can't accuse anybody of not having listened. But we still are at this point where I remain in my belief in the budget environment that rail garrison is the way to go. But it has to be clear that my only problem with the Small ICBM is budget. Most of all, we need a mobile ICBM in our strategic Triad of deterrent forces, whatever it takes to get that.

Mr. KYL. General, first, let me say I absolutely concur with your comments both about the advantages of a Small ICBM, the keen desirability of having that kind of weapon in our arsenal if possible. The necessity of making our Peacekeeper survivable and putting it on rail garrison. All of those things I thoroughly agree with.

I just think, and certainly the Chairman is to be commended for trying to come up with some suggestions as to where we might get the money if a political compromise were necessary, to go to the Small ICBM, but I don't think we have gotten there yet.

The CHAIRMAN. Would the gentleman yield?

Mr. KYL. Let me finish this one thought, Mr. Chairman.

It seems to me—this may sound a tad political, but I simply put it in the context of this city—there has been a lot of criticism of the so-called Darman budget for failing to identify where the cuts are going to come from. I think it is an equally valid point of reference for us here. If we are going to make that kind of recommendation to the full body then I think we need to have some kind of idea where it is going to happen.

The CHAIRMAN. Let me just pick up on the point and make it clear that on the SDI number I thought we ought to put all of these programs into a package and then look at what we are going to fund. I am not suggesting that we cut SDI below the $4 billion. I am just saying if you agree to SDI of $4 billion, we have got the problems. SDI is $4 billion in 1989, $5.6 in 1990 and $6.5 in 1991.

Mr. KYL. Underfunded at all three levels. That is part of my problem, Mr. Chairman.

The CHAIRMAN. I just want to make my point clear. I am saying if you flatten out the SDI number you can pay for this. I mean, that is just one spot. You have $4 billion for 3 years for SDI. That saves you $4.1 billion and the General only needs $4 billion to fund the Midgetman.

You are asking me where I get the money. It is a fair question. I am telling you you can flatten the SDI number.

Mr. KYL. If it is flattened the SDI number that is cut of course, even if you figure 4 percent inflation, you are going to be under that level.

The CHAIRMAN. Let's not debate the point. I am just saying you may not like where I have come up with the cuts, but I have come up with a proposal.

Mr. KYL. That, to me, I think is the relevant question, which is, are we making a political decision here which has severe operational consequences or research and development consequences?

The CHAIRMAN. Of course. We make major budget decisions all the time.

Mr. KYL. We have to weigh, we have to balance the considerations between forcing a compromise to something like the Small ICBM to consider what it would do to the remainder of our program. As I said, we haven't even talked about the outyear negative funding wedge that Mrs. Byron, for example, has reminded us of in every one of these hearings.

We haven't talked about the effect of sequestration, which Bill Dickinson talked about earlier, and we haven't talked about the IOC, the fact that this presents a much longer IOC than we would by purchasing the MX. So there are many things that have not been weighed in this.

I simply want to suggest that we ought to re-wrestle with these fundamental questions and not sweep them under the rug simply because we have concluded that politically this is what we have to have.

The CHAIRMAN. Nobody is sweeping them under the rug.

Mr. Darden.

Mr. DARDEN. Thank you very much.

General, I realize this is not the forum to raise this issue at any length, but I did want to make passing reference to it. That is, the fact some of us were very surprised, if not shocked, to find out that the cost of moving the 401 Tactical Fighter Wing from Spain to Italy is going to cost us about $1 billion more than we anticipated. I would suggest to you that that might be a place where we can save $1 billion. I know you are going to be looking at that situation very carefully.

Second, I want to weigh in and realize I don't weigh in very heavily around here, but I want to weigh in, such as it is, against stretching out programs. I am no fan of the C-17. You know that. But I still think the idea of stretching it out or stretching any other program of this sort out, does nothing except drive the cost up and put these decisions off and really cause more problems in the outyears.

Having said that, now I want to ask you if you had the go-ahead today to go forth with the rail garrison plan as submitted and as proposed, and you got the call from the White House, and they said the General's money will be available, we are weighing in, we are emphasizing our option, when would the plan be completed and would the rail garrison be operational?

General Welch. The IOC, whether or not we are talking about rebasing the first 50 or adding new Peacekeepers, it doesn't make any difference to the IOC. The IOC would be 1992.

Mr. Darden. What part of 1992?

General Welch. I don't recall.

Mr. Darden. Sometime during the calendar year 1992?

General Welch. Calendar year 1992. The time to have 50 missiles deployed on the rails, again either new missiles or rebasing the current missiles, would be late 1994 to early 1995. What would happen beyond that? That decision can be made in 1994 or so. So just talking the program of 50 missiles, whether or not they are new missiles or rebased, 1992 is the IOC. Late 1994 to early 1995 would be the FOC for the other missiles.

Mr. Darden. I realize this is not completely within your arena, but roughly when do we anticipate the last of the Trident IIs will be equipped with the D-5 missile?

General Welch. Well, I don't know that.

Mr. Darden. I realize this is a very iffy question, but when, assuming whatever plan we have now goes forward, when will the B-2 become operational? The IOC as it stands now?

General Welch. I don't think I can talk about that in open session, Mr. Darden.

Mr. Darden. What I am suggesting to you today and what, the point I am trying to develop—and I don't understand synergism obviously as well as the Chairman—but it appears to me that no one here contends that the Peacekeeper in its silos is not vulnerable, however, don't you think, given the fact we are coming along with the D-5s and the sea leg of the Triad and the fact we still have the penetrating bombers operational, do we need an absolutely invulnerable, perfect, failsafe ICBM leg?

Isn't that why we have a Triad to start with, so we don't become completely dependent on one specific leg?

General Welch. But what makes the Triad, what gives the synergism in the Triad, is each leg of that Triad brings a special quality and each leg of that Triad has its own vulnerabilities. While the total overall picture of deterrence is served by looking at the aggregate, nonetheless, the individual qualities of the individual legs of the Triad are important in the overall response capability and particularly when we speak of flexible response.

We moved away from that a long time ago. So what does the ICBM bring you [illegible]t nothing else does? What it brings you is absolutely assured connectivity. That is, assured ability to transmit the message to launch it very promptly and with great assurance, and it gives you prompt response.

It also gives you by far the lowest cost, day-to-day alert cost. In my opening comments I said there are two things we have to consider. One is we want the lowest possible day-to-day alert cost because that is what we bear every day, every week, decade after decade. That makes these costs very important because they are always with us.

The lowest cost day-to-day alert costs, are always ICBMs, particularly MIRVed ICBMs, simply because they maintain such a high alert rate for such low manpower costs. That is what you get out of ICBM you don't get out of any other leg of the Triad.

The other legs have their own special qualities and weaknesses. Right now the weakness of the ICBM leg is it is vulnerable to attack, which leads you to a high propensity for a rapid launch decision. That causes a good many people to be uncomfortable. If we know how to fix that vulnerability and remove that particular liability, it seems it makes a great deal of sense to do that. That is what we get by going to a mobile system.

Mr. DARDEN. Just for the purpose of this discussion, given the worst case scenario, in which our ICBM leg becomes virtually disabled or totally destroyed, still don't you have confidence in the other two legs to the extent that we would still have a deterrent?

General WELCH. If you are asking if I would be comfortable with a diad, the answer is absolutely not. The problem with a diad is when you do the worst case calculations about how can the Soviets respond over time to each leg of the Triad, then you can become very nervous about the future. As long as you have the Triad—that is why the Triad has been such a time-proven, long lasting concept. As long as you have the Triad, each leg requiring a totally different Soviet approach, there just is almost a zero possibility that the Soviets could find a way to negate or to have a successful first strike against a Triad.

If you go to a diad, you simplify their problem. If you go to a diad and then they find the solution to one leg of that diad, then you are going down to a monad and nobody wants to be there. So moving away from the Triad would I think be a fundamental disastrous decision for this country to make.

Mr. DARDEN. I am not suggesting that we move away from the Triad. What I am suggesting to you is that should an adversary be able to, in the worst case scenario for us, eliminate and disable one component of the Triad, still would not then the entire system function design in the first place, which is to have the other two capable legs, which then could respond?

What I am asking you, and certainly this is not a rhetorical question in the sense that I am suggesting the answer because I don't know. But if in the worst case scenario I mentioned then still would that not be a deterrent, because we do have the other two capabilities? So is an invulnerable land based ICBM an absolute requirement?

General WELCH. Well, the first answer to your question is that if the Soviets should, over some fairly rapid period of time, find a way to neutralize one leg of the Triad, am I confident the other two legs will maintain deterrence?

The answer is yes, for a time. So the answer is yes, I am confident for a time of these two legs—but you would have to do something to reverse that. If you realized that one leg of the Triad, that the Soviets had come up with a countermeasure that could neutralize one leg of the Triad, you would never sit there content and say well, there is one leg gone. Now lets see what happens to the next leg. You would immediately embark on a course of action to restore the robustness of that leg of the Triad.

If it should happen suddenly do I think we would then have an adequate retaliatory capability, the answer is yes. But I agree with Mr. Dellums when I am really not terribly interested in talking about strategic nuclear war fighting, because whether or not you do very well in strategic nuclear war fighting or very poorly doesn't have much impact on what happens to the United States.

I am interested in deterrence. So, maintaining a healthy Triad and doing those things to restore a robustness of the Triad when you see it beginning to erode, just has to serve the long term interest of this country.

I think I answered your question correctly when I said if suddenly there should be a failure of one leg of the Triad do we still have strategic nuclear deterrence. The answer is yes. But you can never be content to sit there. Because you begin to erode. It begins to disappear.

Mr. DARDEN. Thank you very much.

The CHAIRMAN. Mr. Bustamante.

Mr. BUSTAMANTE. Thank you, Mr. Chairman.

Let me just get some information in reference to budget and budget process. In the ICBM budget what increase over last year are we looking at, or is it a flat budget?

General WELCH. In the ICBM budget, since the President has made no decision, we have left the ICBM budget exactly as it was in the Reagan budget.

Mr. BUSTAMANTE. Then that is the recommendation that came from President Reagan to us?

General WELCH. That is correct.

Mr. BUSTAMANTE. Mr. Chairman, what are we looking at as far as markup in our committee, May at the earliest?

The CHAIRMAN. Could be that late. We are waiting on a budget resolution.

Mr. BUSTAMANTE. So I know that it is difficult for you at the Pentagon, without a Secretary of Defense—the first process would be for you to recommend, each of the services to recommend a budget to the new Secretary?

General WELCH. That is correct. Yes sir.

Mr. BUSTAMANTE. Then of course he goes to the administration, to the President. Where does DOD come into the board as far as once you give or the Secretary of Defense approves recommendations to the President, do they come in at that time and recommend reductions on the overall budget or what role do they play?

General WELCH. Well, after consultations with whomever the President consults with, we are given the defense budget top line guidance and that top line guidance is in turn given to the services. Then we have to submit our changes in order to live within that top line guidance. Then that is put together in the Defense Resources Board process and agreed to by the Secretary of Defense and that becomes the defense budget submission.

Mr. BUSTAMANTE. See, my concern, Mr. Chairman, in this area is of course we are looking at some numbers and some have said that they are really optimistic numbers when you look at the Bush budget as Darman has presented it. There is no real base line, there is no numbers really but they are talking about interest rates coming to a couple of points below what they are right now, or three points.

So when we look at these numbers that have been bandied around here, if we don't meet some of these budgetary assertions that are being put out, we could be in a worse scenario than is being talked about. I hope that—I don't want to be pessimistic. I want to be optimistic, but as we talk about stretching out programs, and you and I know that if we stretch them out, the more we stretch them out, the costlier it gets for us, that would really put you in a bind, wouldn't it?

General **WELCH**. Yes, It would. it would be a great deal more pain to go through.

Mr. **BUSTAMANTE**. Thank you, Mr. Chairman.

The **CHAIRMAN**. Richard Ray.

Mr. **RAY**. Thank you, Mr. Chairman.

General Welch, thank you. You are holding your own real well. I am grateful for your testimony here this morning. We know that the shortfall in funding is obviously going to hurt all of defense, and it is going to affect the Air Force.

You have pointed out some of the very deep cuts that you have already made. I guess all of us are under stress this morning to see in The Washington Post—I assume therefore it is correct—that IRS had not much in their overhead, and is now down to a shortage of paper clips, copy paper and people. I guess, hopefully, the investigators, too.

But I am pleased to see and hear from the Comptroller General of the Air Force yesterday, who appeared before the Readiness Defense Subcommittee, that the Air Force is recognizing that O&M depot maintenance and logistics are very strong priorities and have recognized that in the funding level, because in my opinion, it is the health of all of the major Air Force commands depends on these area being funded very well.

I thought yesterday that the Comptroller of the Air Force was probably in the hottest seat in town, but now, I am beginning to think maybe you are actually sitting in that seat there.

Secretary Weinberger came before the committee a few months ago, I believe it was in late November, a very pleasant meeting. The chairman at that time mentioned to him that he seemed to be mellowing as the publisher of Forbes Magazine, and I think he was telling the chairman he thought he was mellowing, too, to some degree.

The question asked the former Secretary at that time was, with a frozen defense, with inflation only for the foreseeable future, what does that do to DOD and defense? He said it does a couple of things. Obviously, it requires a reduction in the $172 or $173 billion in the defense pipeline, and it probably does mandate a reduction in force structure.

Many of us assume, then, from that that probably would also mandate a change in defense strategy, strategy that we have now for fighting a major war or deterring around the world, and what it costs to do that, and so forth.

I guess the question that I want to come to you with now, since we are told that about 60 percent of the DOD budget—I assume a good portion of the Air Force budget—is dedicated to NATO and to Europe, and as we look at these crucial times ahead, is it going to require that instead of reducing troop strength in this country first and probably major weapons system that are necessary for the future, and deterrence, that we might have to take a look at dealing with some reductions in NATO?

Is that something you talked about in open session, or do you want to address it at all?

General WELCH. I will make a comment on it. That is the siren song for the Air Force, trying to find large chunks of money by reducing people and force structure is just not there. You take down—if you take down a wing of Air Force fighters, you save about $150 million a year.

So, for 150 million a year, you have given up 72 combat aircraft. When you are dealing with $20 billion, if you spread that evenly over the years, which it is not, we are talking $4 billion a year, it would take a lot of $150 million wings to find $4 billion.

So, you can't make that substitution. We can't get there by reducing force structure.

As to the burden-sharing issue, I would just add one thought about burden-sharing. I certainly share the frustration with the level of funding commitment that some of our allies make to this mutual problem. I think it is important to realize, though, that forward defense serves us very well.

If we were willing to make the battlefield the first hundred miles of the East Coast instead of Germany, we could save a lot of money.

Mr. RAY. General, you made a strong case for the Triad, and I tend to come down on your side in this case, but it doesn't take an expert to look at the economic situation of this country now, the debt, the deficit, 700 billion, soon to be a trillion dollars held in foreign hands over 50 billion in interest going to foreign countries each year.

The economics of having and continuing our defense as we know it, in my opinion and the opinion of a whole lot of people, is just not going to work. So, it seems to me that if we have to make a decision on a very strong Triad and a very strong NATO, that one of the others is going to have to give somewhere.

So, let me just follow up about moving the Air Force base from Torrejon, Spain to Italy. Members of the committee were in Spain not too long ago, and got a very disturbing briefing from the State Department and from the Air Force and the Navy about the situation and then, of course, we have run into additional—what may be rumors—since returning from that particular visit.

First of all, we would have assumed we would only pick up the 28 percent NATO share of that move. Now, we do find that the 16th Air Force wants to move along with it, which will cost a considerable amount of money.

We also are disturbed that real estate people in Italy, we know for a fact, have employed lobbying firms, some of the most powerful in Washington, D.C., to lobby very strongly for this base to go to a remote area of Italy, where the cost of running utilities in there would be very expensive.

It is the communist part of Italy. We are told if you visit in that area, you see hammer-and-sickle signs nailed up on the telephone poles. The host country, as we understand, is not committed to providing protection to that base.

We are also told that we will have to have residential space for 10,000 people to live on the base, and that the real estate people are tagging the value in their remote area of Italy at about $10,000 per acre, which, of course, drives up our 28 percent share of that pretty heavily.

I had heard—I am not sure it is correct—I had heard previously that we had decided to bring that wing back into the reserves in this country. If we should be looking at foreseeable reductions in NATO, it would seem to me that it would be pretty wise to consider not building a new Air Force Base.

I understand we have got $15 million in the budget for planning already for 1990. It would seem to me, we ought to give consideration—you might want to submit a good bit of this to the record, but I wanted to put in the record, it is kind of a disturbing situation, which I think might take away from the effectiveness of what we have already got.

General WELCH. I will just make a couple of comments. That is the only U.S. combat unit on the southern flank, that one wing. So, that wing has importance, not only from its combat capability, but from a NATO cohesion standpoint. There will be a lot of difficult problems to deal with to bring that base to fruition.

Any time you have to withdraw land, whether it is from Italians or Americans or Greeks or anyone else—it is a difficult process. I don't think there is any question about that.

The Italian Government has been very courageous about this whole thing. The Italian Government has worked very hard and has been forthcoming, but that doesn't mean there won't be a lot of problems.

The location of the base was our choice. That was our desire, to put the base in that area, of the various opportunities we had, because air space is good down there. It is a pretty good location for people.

So, all told, it seemed like a logical place to put the base. The defense of the base, the reason why the Italians haven't committed to the defense of the base, is that it doesn't meet the NATO requirement in that we have not declared it to be a combat location.

That is an operating base, peacetime operating base, and those forces deploy to other bases in the area for their wartime employment. We have not acquiesced to not establishing defenses for that base, but it does not meet the NATO criteria.

Mr. RAY. As I understand, the first new base in 40 years that we built was down at Comiso, down at Sicily, the cruise missile base?

General WELCH. Yes.

Mr. RAY. That was the first new base in 40 years. This will be the second new base we have built in 40 years, I suppose. What is the status of Comiso? We are now going to give it back to the Italians, I suppose, since we have entered into the treaty to discontinue the cruise missile program from that base.

General WELCH. Yes.

Mr. **Ray**. I just want to make the point, we have got short dollars.

Mrs. **Byron**. Would the gentleman yield?

Mr. **Ray**. Yes.

Mrs. **Byron**. Was I to understand that was a very weak um-hum? Does that mean the base at Comiso goes to the Italians?

Mr. **Ray**. At Comiso? I am not sure.

Mrs. **Byron**. Mr. Ray asked you if it was going to the Italians, and I heard a very weak, "Um-hum."

General **Welch**. The answer is yes. The question we—well, let me rephrase that. We still have a claim on Comiso. If we have something we want to put into Comiso, we have the right to do that, but we don't want to stay at Comiso just because we built Comiso, because that still costs money.

Assuming we decide that we don't want to move something into Comiso, then it would revert to the Italian Government, that is right.

Mrs. **Byron**. But no benefit or scrubbing of property for property looking at the new base that we are getting ready to build for the wing?

General **Welch**. I would have to provide for the record what the legal arrangements are for returning those bases. It is different in each case.

[The following information was received for the record:]

Support Facilities

In accordance with the US and Italian agreement signed November 9, 1983, concerning the technical assistance and logistics support of the GLCM in Italy, "The United States of America will be compensated by the Italian Government for the residual value of all of the facilities acquired, developed, and constructed at United States expense and not removed or otherwise disposed of. This will include also those facilities developed or constructed jointly by United States and Italian funds, when such facilities or any part thereof are no longer needed by the Military Forces of the United States. The amount and manner of compensation shall be negotiated between the appropriate authorities of the two governments.

Mrs. **Byron**. It is the gentleman from Georgia's time, but it is an awfully weak "um-hum."

General **Welch**. What that was, was an "I don't know". That is what that "um-hum" was.

Mr. **Ray**. We left the base in Cigli a number of years ago. They didn't want us to leave, but we gave them a considerable amount of money each year, so now they have taken that base and are doing very well with it.

Now, we do need a little property in Izmit, Turkey, for housing our military people and so forth, and we can't get back on Cigli. We have got to go and buy some expensive property there. I just hope that if we are going to retain Comiso in some sort of way, we will be in a little bit better situation 10 years from now if we have to get on from there than we are in some other areas.

Thank you, General. You have been very gracious with your time and have done a very fine job in your testimony this morning. Thank you.

General **Welch**. Thank you.

The **Chairman**. Mr. Hochbrueckner.

Mr. Hochbrueckner. Thank you, Mr. Chairman. Again, I agree, we must maintain the Triad. Certainly, I'm sure the Navy appreciates your comments about how important a mobile force is. Obviously we accept that as a support of the submarine launched ballistic missile program.

Let me ask this. Do you believe that 100 MX in rail garrison mode are more survivable, equally survivable or less survivable than the Midgetman program as presently envisioned? How would you characterize that based on your experience?

General Welch. I think the straightforward way to characterize that is rail garrison requires a decision and response to crisis to make it survivable. Small ICBM requires no such decision. Given the decision is made and early enough to get them deployed on the rails, then I don't think there is a great difference.

There is another factor and that is that Small ICBM is more resilient, inherently more resilient to future countermeasures that we haven't thought of yet. That doesn't mean they're not both resilient, but a road mobile missile has inherently more resilience. But given that the decision is made, then they are both virtually unattackable.

There is that period when you must do something in order to make rail garrison unattackable and that always leads to the discussion of what are the probabilities that the decision will be made.

I think it's very high. I think it's an easy decision to make. It's not universal opinion but I don't have any great problem with that. But the answer is given a decision, they are both virtually unattackable.

Mr. Hochbrueckner. Assuming you have in fact deployed the rail garrison.

General Welch. That's right. Whereas in the case of the Small ICBM, you don't have to have any such decision.

Mr. Hochbrueckner. There's no reason to believe if we were subjected to an initial attack, which I see as the only way we would go to war—I don't ever see us attacking—obviously, it would not be in the best interest of an enemy to give us any warning.

So one can raise the issue of survivability related to time delays and what-have-you. If we go back to—one of my colleagues raised an issue earlier about the cost. If we talk about the delta, the differential cost in terms of having Midgetman in place of rail garrison, I think the numbers I heard earlier were something like a $17 billion differential—was that the number?

General Welch. I didn't get through all that arithmetic. I think I gave the numbers. The numbers, the latest numbers that we have, and these are all in 1989 dollars so this may be a little different than what you heard before because they are from 1988, the cost to complete is 24.8. That's the equivalent to 23.5 in 1988 dollars, but 24.8 for 500 Small ICBM warheads.

Mr. Hochbrueckner. What have you got, 24 point what?

General Welch. 24.8, but that is 1989 dollars, Mr. Chairman.

The Chairman. That compares to the 23.55 which was the 1988 numbers.

General Welch. That is the same number. It's just escalated to 1989, just because people have been asking me why are you still talking about 1988 dollars.

The CHAIRMAN. That's important. This is the cost to go.

General WELCH. Cost to complete.

The CHAIRMAN. The completion in this case is how big a program? This is the 500 program?

General WELCH. This is the 500.

The CHAIRMAN. Single warhead?

General WELCH. Yes, sir, 37,000 pound single warhead. The cost to complete additional 50 Peacekeepers in rail garrison independent of rebasing is 9.1 in 1989 dollars.

Mr. HOCHBRUECKNER. But I assume when we talk about the 500 Midgetman, we are already counting them in some kind of HML or spread-around basing so their basing is already handled as part of the 24.8.

General WELCH. That's right. 24.8 is total cost to base them on Minuteman sites around in the north. 9.1 is the cost to complete if you deploy an additional 500 Peacekeeper warheads and that is apples and apples, because in both of those cases, you get additional 500 warheads.

Mr. HOCHBRUECKNER. So if we assume that 100 MX in rail garrison mode let's say equaled 500 Midgetman in terms of survivability—let's just accept that argument, we are saying straight dollar difference then would be $25 million versus $9 billion.

General WELCH. For 500. That's for 500 warheads of each.

Mr. HOCHBRUECKNER. I understand. That can—I would assume that you would rail garrison the other MX.

General WELCH. We are talking 100—if you want the price of 100 Peacekeepers on the rails.

Mr. HOCHBRUECKNER. We have already paid for 50.

General WELCH. That's $11.9 billion.

Mr. HOCHBRUECKNER. That becomes the $9 billion up substantially I would assume.

General WELCH. If you go rail garrison with 100 Peacekeeper missiles, the total price is 11.9.

Mr. HOCHBRUECKNER. So it's essentially—so we are talking about if I make the assumption that 100 MX rail garrison equals in terms of survivability and deterrence 500 Midgetmen, and I put it in those terms, then the difference between the cost of the two programs is about $13 billion.

General WELCH. I am sorry. What was the assumption?

Mr. HOCHBRUECKNER. I'm just making the assumption that 500 Midgetmen are equivalent in capability, deterrence, whatever you want, to 100 rail based?

General WELCH. Of course, I can't accept that assumption.

Mr. HOCHBRUECKNER. What would you call the equivalent? I'm trying to get apples and apples here.

General WELCH. I don't know how to do it. The only thing I know to give you apples and apples is to tell you how much 500 warheads cost in each case, and if the warheads are relatively equal in capability, given the decision to deploy they are both virtually unattackable.

So I can only compare them on a warhead for warhead basis.

Mr. HOCHBRUECKNER. I will accept that. Let me go back to the original numbers, $9 billion versus $25 billion. So we are talking about a $16 billion differential? If we talk about time, how long would you say this system would be of value to us? Ten years, 15 years, before it's replaced by the next generation?

General WELCH. 25 at least.

Mr. HOCHBRUECKNER. At least 25 years?

General WELCH. At least.

Mr. HOCHBRUECKNER. So then we are saying that essentially under $1 billion a year amortized over 25 years we could have Midgetman.

General WELCH. Yes.

Mr. HOCHBRUECKNER. So it really comes down to a political decision about survivability, stability provided by having less clout in one spot which is what you have with an MX.

So it really comes down to a political decision rather than a financial decision, if we are going to amortize this over 25 years. That's how I read it based on these numbers.

Even in the worst case, taking the $9 billion versus the 25—thank you very much, General.

I appreciate that because this is how you make key decisions based on what you think the overall picture is. Thank you very much. Thank you, Mr. Chairman.

Mr. DELLUMS. The gentlewoman from Maryland asks for such time as she may consume.

Mrs. BYRON. Thank you, Mr. Chairman. General Welch, we have looked over the years at what has transpired on the debate we have had on MX and those individuals that were trying to kill the program. We stretched it out for a while. Then we cut back on numbers. We then had those same people that were talking about a small mobile and they were supportive of that.

We now are at a cross-roads once again on MX, and our basing modes, and the small mobile and where we are going.

The three criteria that the General was speaking of, you mentioned B-1 stretchout. We saw the B-1 project canceled, new life brought back into it and then we have seen some fairly serious problems with the development over that, over the last several years, just because we have been trying to integrate, upgrade at the same time we were in a production mode.

You mentioned flattening the SDI budget or I think the chairman mentioned flattening the SDI budget. He mentioned current forcibly down.

You talked about stretching out the B-2. I perceive looking at the B-2 right now with the fact that we have an aircraft that has been unveiled. We have the numbers that are coming in on cost projections. I see a cadre of people lining up to go through the same litany that we did with the B-1.

That concerns me, because as we all know, any time we stretch out, the cost escalates fairly dramatically. We saw that in debates with small mobile. We all are very much aware of the dollar constraints we are operating under. We all are still very much aware of the mission and responsibility that you have in your position. How are we going to continue in the dollar constraints that we have without battering and beating up the system before it gets into the inventory so the American public perceives that we are continuing to buy pigs in a poke that really don't work?

It's a perception but it's also one that I think is very real when we are looking at the problems that we have with the number of dollars that we are operating under and the number in the Triad that you are responsible for.

General WELCH. You won't be surprised that I take exception to the characterization that we buy things that don't work.

The only program that anyone has any issue with right now is the B-1. The B-1 works fine. It is on alert and does what we want it to do.

You characterized when we bring on new systems, they have some growing pains. I would agree.

Mrs. BYRON. They are supposed to. By the time the media get through with them, the American public, the taxpayers, are the ones that we get the black eyes with.

General WELCH. The real problem you bring up is how do we cope with continual changes in the budget levels so that the budget levels we expected when we laid out our development and financial plans—we all too often find that the resources are removed from the financial plan.

When the resources are removed from the financial plan, then the question is asked: "What is the matter with you, Air Force, why can't you manage your business?" The answer is that I don't know how to continue to keep all these programs on schedule when the resources are pulled out of the financial plan.

The buzz word is don't stretch programs. It is easy to say why don't you cancel a big program. The answer is that I would be delighted to find a big program we could cancel if we could solve our financial problem with that.

Mrs. BYRON. Looking at the B-2 program, which I am a strong supporter of and feel we need desperately, but at the same time there is a large number of people who say at what point do we stretch it until it is not a viable production model.

General WELCH. The B-2 has a sticker shock problem, I admit. We justified it not on the cost, but on its value.

At the present time if we had the resources and the financial plan to keep that airplane on the current schedule, that airplane would cost 19 percent more than the B-1. That would be a lower differential between generations of airplanes than any airplane I have seen.

That is kind of academic because, if we cannot keep it on schedule, then obviously the cost will grow somewhat.

In terms of what we expect nuclear systems to do, which is to hold targets at risk in the Soviet Union because that is the essence of deterrence—in terms of that, the B-2 is a good buy. It holds targets at risk at about the same cost as the B-1, less cost than ICBM, slightly more than the D-5 missile. So for that part of its capability it is a good buy.

That doesn't account for the fact that, because of the stealth characteristics, it has a higher probability of arrival than the B-1.

In terms of the value it brings to the Triad, it is cost competitive with any other new system in the Triad.

Mrs. BYRON. Let me bring up another point which I think is interesting and one we tend to forget, which is personnel.

We have gone from a B-5[illegible]ich has a crew of seven or eight, to a B-1 which has a crew of four, to a B-2 which has a crew of two. That has to be factored in because we are looking at the cost of personnel, and that cost is a very large part of our budget.

You mentioned in-force reductions of 31,000 as a way to help save dollars, and a drawdown of squadrons.

Can you give me a breakdown of what type of personnel cuts you are considering?

We came down 12,000 in 1987 to 1988, 500 in the 1988 to 1989 time frame, and 100 in the 1989 to 1990. As we took the GLCM out of your inventory, that should have been a fairly substantial number of personnel that could have been drawn down, because that was a very personnel-intensive system.

General WELCH. The number is 37,000, 31 combat squadrons. That 37,000 takes you through 1989, because that is the implementation period for the drawdowns that we have made the decision on in 1987 to 1988.

I will have to get you the breakout of what years.

Mrs. BYRON. I would appreciate it if you would provide it for the record.

General WELCH. Surely.

[The following information was received for the record:]

PERSONNEL CUTS

At the end of fiscal year 1986 the Air Force military end strength stood at 608,199. By the end of fiscal year 1989 we have programmed our military end strength to be 570,965 for a decrease of 37,234 over the 3 year period. By year these decreases are: Fiscal year 1987 minus 1,164, fiscal year 1988 minus 30,589, fiscal year 1989 minus 5,481.

Mrs. BYRON. I have no further questions.

Mr. DELLUMS. [Presiding] The Chair recognizes Mr. Kasich.

Mr. KASICH. General, I know it is pointless, we are not going to get you to change your views on any of these things.

I voted in the last Congress, as one of the few Republicans, to continue development of the small missile. The reason that I did is that I was one—Mr. Dellums will remember—as a new Member, I argued very vehemently for the MX and I did it on the basis of the fact that we would follow it up with the Midgetman, the whole deal that was part of the Scowcroft report, and I actually read that a couple of times and I think I understand it.

I am not sure we can afford to do the Midgetman. I suspect that we cannot, because the Chairman says there is a $400 billion shortfall over the next 5 years in terms of this funding.

Now, let me tell you what I am going to propose, and I want to get your reaction to it.

I had a reaction from General Herres and it surprised me because he basically did not disagree with what I was proposing.

We complain about the fact that we spend SDI money, $4 billion or $5 billion every year, and don't really get anything out of it. There is no purpose to it, is what I heard opponents argue, why do we spend the money.

Back in 1984 I proposed an accidental launch system that the Armed Services Committee in the House approved, and it called for a study to determine whether we could do the accidental launch and put the money in it. We ended up getting through that and then Sam Nunn blessed the idea of an accidental launch.

I was thinking that we ought to use SDI for a couple of purposes. First, there is not anybody I know in Washington who would not want a system to protect us against an accidental launch. Chairman Aspin said he favors the idea of an accidental launch system and I think the American people will support the idea of an accidental launch system, and we can achieve great success with the system that would be treaty-compliant. If we wanted to deploy something, we would not have any difficulty with people arguing that we violate the ABM treaty.

I will offer an amendment. It probably will not get many votes, but I will raise it in the committee and then on the floor.

I want to raise the issue because I think we ought to deploy a Phase I ground-based system that is treaty-compliant that will protect us against limited attack and against accidental launch. I think we ought to put it in Grand Forks, ND.

It will achieve three things: protect against accidental launch, nuclear attack, and at the same time also protect our MXs. If you make the MX rail garrison, if you put it there with the MX and you also put up the Phase I SDI program—which, by the way, could be folded into a more complete system somewhere down the road if the Congress would so choose and we could resolve the political arguments—you have a very practical use for SDI.

How do you pay for it? You pay for it by taking the money out of the Midgetman, whose whole purpose is to guarantee survivability, and the rail system coupled with the SDI would certainly confuse Soviet military planners. I know experts are looking at this today.

When you put the MX on a rail garrison and couple it with a Phase I system, you do guarantee the survival of a significant portion of your MX missiles.

I wondered what your reaction would be to that, General. Do you think it has merit from a strategic point of view?

General WELCH. I certainly have no difficulty about the accidental launch system. We simply have to weigh what it costs versus what we get from it. That is part of the review that is going on at the present time. I have been reasonably positive about that.

The only reason I have been only reasonably positive about it is that it has very little to do with my business of deterrence.

That doesn't mean it is only trivial to keep bombs from falling on Washington. It has little to do with deterrence.

Mr. KASICH. I am suggesting it has something to do with deterrence.

General WELCH. It would have some deterrent value there.

I think it is a little bit of a mistake to characterize what goes on in the overall SDI program at the present time as producing nothing. The reason I feel that way, of course, is that the SDI program also includes a lot of programs that had purposes other than SDI that were swept up into SDI when we formed that office, one of which is BSTS. Either BSTS or an almost equal cost replacement from the current ballistic missile warning system is essential to the future. That is part of the SDI program.

I don't want to get into a long discussion about SDI. You didn't ask for that.

There are programs subsumed in the SDI that are essential to purposes other than SDI. So you cannot take all the SDI money and spend it for something else.

Mr. KASICH. The President himself commissioned a study about how you actually move on SDI. You go Phase I and you do the system we can do now and you deploy that.

The bottom line here is if I was to convince you or if experts in defense were to convince you that an SDI program that is not inconsistent with the goals or objectives of the President—and this clearly is not—would guarantee the survival of MX missiles, and that is what we are worried about, survivability—if I could convince you we could confuse Soviet planners and, second, we would guarantee the survival of an MX force, why wouldn't you favor that, or would you?

General WELCH. I am positive about the accidental launch system. It is another thing to say it guarantees the survival, that the limited protection system which is treaty-compliant does not guarantee the survival of the MX. It contributes to it.

After all, there is a survival system around Moscow and no Soviet thinker believes it guarantees the survival of Moscow. I guarantee you, it does not. It just raises the price to attack.

Mr. KASICH. There are experts, and maybe you should have your people take a look at this; in fact, we will be glad to hook you up with those who have studied this, who have told me that even if you don't put the MX on a mobile system and you deploy the Phase I system, you will have MXs that will survive an attack.

You will not have all of them survive, but you don't need them all to survive. You only need some number to survive.

Second, you also save the money. Your ultimate idea here is to have some survivability and to confuse Soviet military planners. You achieve both of those goals with this idea.

Can we put these people in touch with you and have you take a look at this?

General WELCH. I would be delighted to listen to any new information.

I am not objecting to the characterization that a limited protection system contributes to protection. I am objecting to the concept that a limited protection system guarantees protection. It does not.

Mr. KASICH. I am suggesting that a limited protection system does guarantee survival of some portion of the MX missiles in Grand Forks.

If I was to convince you of that, if I was to convince you that it guaranteed the survival of 30 to 50 warheads, you might have a different position.

General WELCH. I would be delighted to see that.

A limited protection system is limited to 100 interceptors. The Soviets have their system.

But I would be delighted to see their calculations.

Mr. KASICH. Thank you, Mr. Chairman.

I will send them over to you, because the analyses I have seen have been interesting. If I am wrong, I want to know. But I think we need to take a look at it.

Mr. Dellums. I would like to say to my colleague that before you develop the amendment, you have to consider the question of the clear prohibition ABM established related to territorial defense.

The question of territorial defense is an important issue my colleague would have to resolve, because ABM is very explicit in that regard.

Are there any additional questions?

General, I want to thank you very much for coming before the committee. You and I start from different assumptions and I respect the fact that we do start from different assumptions.

Just one point. If you accept the logic of your assumptions, which is that the land-based leg of our nuclear triad should be independently survivable—if you accept the logic of that, then it seems to me that with respect to the issue of the deployment of the 50 MX missiles that are now in existing Minuteman silos, that that option is very clear. You have to remove them, just by virtue of your own logic, because if your logic is extended, then it seems to me that, rather than pursuing a course in this time of budget austerity of purchasing additional weapons, that it just makes sense, given your own logic, to take those missiles out of the existing silos.

Those are not my assumptions. I believe the issue of vulnerability and survivability are handled rationally and clearly within the concept of synergism.

But if you accept your starting point for your argument, it seems to me you have no argument, you have to remove them. If the Congress, in its wisdom, or lack thereof, makes the judgment to go forward with the rail garrison, you have to go forward with putting the missiles in a mobile mode. In that way perhaps some savings take place.

There being no further questions, General, we would like to thank you for your contribution to the proceedings, and indicate that there will probably be a number of follow-on questions which we hope you will respond to in writing.

[The following information was received for the record:]

Modernization of Minuteman II and III Fleets

Question. According to press reports, the Air Force is considering modernization of the Minuteman II and Minuteman III fleets with follow-on Minuteman IVs and Minuteman Vs. Is this true? How can this be justified in the current budget environment?

Answer. New configurations are being considered for Minuteman (MM) missiles to provide maximum force structure flexibility under a START treaty. The goal is to optimize US forces under the treaty while complicating the attack planning problems facing Soviet war planners. The new configurations are called MM IV and MM V. MM IVs would carry a single MK-12A re-entry vehicle (RV). About half of these missiles would be obtained by downloading two RVs from MM IIIs. The remainder would come from MM II missiles that are converted to match the downloaded MM IIIs. Conversion of the MM II missiles might involve additional MM III third stages (a remanufacture program is in progress), post-boost vehicles, and shrouds. In addition, the MM IIs would require upgraded guidance systems, MM Vs would carry two MK-12A RVs and would be obtained by downloading one RV from MM III missiles.

Program implementation cannot be determined until the final outcome of START negotiations are clear and deployment levels for other strategic forces are known.

Future Cost of Midgetman Missile

Question. If the Midgetman missile receives no money in the fiscal year 1990 budget, how much will this cost us in the future if the program is restarted?

Answer. It is very difficult to answer this because so many assumptions must be made. As you know, the Small ICBM has been in full-scale development since 1986. We have made significant progress on the missile and the hard mobile launcher. Both are being tested this year. Closing out all the contracts and then attempting to restart them a year from now would be difficult contractually and programatically. It would cost a significant amount of money to recompete contracts and would cause the projected initial operational capability (IOC) to slip several years.

Mr. DELLUMS. We recognize that the strategic review process is going forward and that you are operating in some degree of ambiguity. Notwithstanding that, we appreciate your appearance and the contribution you have made to the joint hearing.

With that statement, the joint hearing stands adjourned.

[Whereupon, at 12:25 p.m., the subcommittees were adjourned.]

THE ARMY'S ANTI-ARMOR PROGRAM

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Thursday, March 23, 1989.

The subcommittee met, pursuant to call, at 10:25 a.m., in room 2118, Rayburn House Office Building, Hon. Les Aspin (chairman of the subcommittee) presiding.

STATEMENT OF HON. LES ASPIN, A REPRESENTATIVE FROM WISCONSIN, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

The **Chairman**. Today the subcommittee examines the management of armor and anti-armor programs by the Army. Even in the Gorbachev era of announced cutbacks in armor, the armor/anti-armor balances in Europe continue to be of vital importance to our security.

This morning we are concerned not so much with the programmatic details as we are with the overall system by which the Army assesses the threats and designs and produces its systems.

Our first witness is General Donn Starry, Chairman of the Defense Science Board examination of the Army's armor/anti-armor efforts. He will recount the findings of that panel and give you an assessment of what happened to date.

The next witness is Dr. James Richardson of the Defense Advanced Research Projects Agency (DARPA). He heads the DARPA program that the Defense Science Board recommended to help the Army catch up in the armor and anti-armor race.

Finally, we have Lieutenant General Don Pihl, the Military Deputy to the Assistant Secretary for Research, Development and Acquisition.

I think what we will do is let everybody give their statement in that order. Then we will proceed to questions if that is all right.

General Starry, we will lead with you, sir.

STATEMENT OF GEN. DONN A. STARRY, USA [RET], EXECUTIVE VICE PRESIDENT, FORD AEROSPACE CORPORATION, SPECIAL ASSISTANT TO THE PRESIDENT, BDM INTERNATIONAL, INC.

General **Starry**. Thank you, Mr. Chairman.

I have submitted prepared testimony. With your permission, I will highlight that.

I have been asked to testify in regard to issues growing out of the Defense Science Board 1985 summer study on armor/anti-armor of which I was the chairman. Particularly, I have been asked to present my views concerning progress that has been made toward fixing systemic problems identified in the summer study, and to suggest what might be done to institutionalize processes that appear to have succeeded in providing some relief from the systemic problems.

To respond to the requirement levied on me, I propose to do the following:

1. Describe the systemic problems with the acquisition system which were reflected by the 1985 summer study recommendations.
2. Highlight those recommendations of the 1985 study which particularly reflected our concerns in regard to the flaws in the acquisition system.
3. Offer a summary view of progress to date in overcoming the systemic problems. Finally, suggest what might be done to overcome systemic problems in the acquisition process.

To do all that, I will draw heavily from my testimony on armor/anti-armor issues before the Subcommittee on Conventional Forces and Alliance Defense of the Senate Armed Services Committee of the One Hundredth Congress on 13 April, 1988.

The principal finding of the 1985 armor/anti-armor study was that in armor/anti-armor systems the Soviets are outmodernizing the West, the U.S. in particular, at an alarming rate; that we are behind, getting further behind; and that the problem is more one of how our respective acquisition systems are managed than anything else.

Three primary causes for this situation stood out as first among many. They were:

1. A threat definition and projection system that is more reactive than proactive.
2. A research and development-to-fielding system that finds our highly-touted technical advantage still in the labs while threat's so-called "less advanced" technology is in the field.
3. A programming-budgeting system that inhibits the establishment of a relevant force modernization rate.

First, a few words about the threat. It is crucial to define the threat early, because the user statement of operational need begins with threat definition; what we face, if deterrence fails.

Given the time to bring new technology to fielded systems, postulate new tactics, organization and training, it is constantly necessary to project what the threat is likely to be in the future. While this is a tough task, it is by no means impossible. It is that we just don't do it very well.

This is not an indictment of our intelligence system. It is a commentary on the way we make, or fail to make, decisions. The problem is that the decisionmaking apparatus lacks institutional resolve. It responds best to an 8x10 glossy print from an overhead platform showing some new "thing" on a test track, being put into a silo or being issued to troops.

By definition, this means that full-scale engineering development of that equipment is nearly done, and fielding is close at hand. It guarantees that we are as much as eight to 15 years behind in fielding new capabilities to meet new threats. It condemns us to forever react rather than act; it means we have given the initiative to the other side.

It is for no lack of technical capability that we fall behind. It is because we spend our money and wait, lured by the notion that a few more bucks (read millions) and a little more time (read years) will result in vast improvements. In fact, the late or delayed application of new technologies to fielded systems is the single most important technical problem facing "the most technically advanced nation on earth"—and not just in military systems.

The third problem lies in the program, planning and budgeting system. The only way to modernize intelligently is to block upgrade systems in order to build and sustain a competitive rate of modernization. Again, the culprit is our decisionmaking—or rather, indecisionmaking. The Soviets are running circles around us in fielding new capabilities. We could easily compete, given half a chance.

In sum then, we find ourselves almost always in a catchup-mode. By the time we catch up, momentum on the other side has put the threat ahead of us once more. So we hardly ever catch up.

Worse yet, we are unable to achieve a modernization rate that can match or better that on the other side. The end result is that the Soviets are outmodernizing us at a rate of about four to one. Every year they modernize a force the size of the total U.S. heavy force; every 2 years they modernize a force the size of the total NATO heavy force.

The task force reviewed all ongoing armor/anti-armor development programs, and reported to the Secretary of Defense that our principal problem is one of management. Therefore, most recommendations can be summed up under the general heading of management initiatives. These included the following:

First, to insure competition and objective evaluation in threat assessment, and in research for developments to counter the threat. In all too many cases both threat assessment and developments to counter the threat were under the purview of the same laboratory. With judge and jury one and the same, the lack of competition insured lack of objectivity.

Second, better utilize industry/Department of Energy resources by creating competing armor/anti-armor design and development programs. The purpose here was to bring the considerable technical capability of national labs and industry laboratories more directly to bear on our most critical problems.

Third, improve existing databases and analytical tools and share those with industry and DOE for application to armor/anti-armor research and development. The databases were found to be outdated; there was minimal current test and evaluation data, and phenomenology databases were outdated and incomplete. In many cases, especially in the Army, the most modern and advanced computing equipment available had not been harnessed to tasks requiring large computational workloads.

Fourth, the OSD, DARPA, should establish an advanced armor/anti-armor technology research program, designed to provide OSD oversight into and coordination of not only basic armor/anti-armor research, but of subsidiary technology programs such as manufacturing technology, Very High Speed Integrated Circuit (VHSIC) insertion, munitions-related programs, and spinoffs from programs such as SDI, of technology applicable to the armor/anti-armor equation—electrothermal and electromagnetic launch technology, for example.

Fifth, ongoing armament improvement programs should be reviewed and modified as necessary to prioritize technologies which overmatch threat protection levels expected at the anticipated time of fielding.

Sixth, future armament, as well as armor improvement programs, should field systems at a pace which provides a rate of modernization at least equal to the expected rate of improvement in threat systems.

Seventh, OSD, in conjunction with the services, should develop an armor/anti-armor master plan designed first to catch up with and overmatch the expected threat, and second, to establish and sustain a competitive modernization rate.

The Army should initiate development of requirements for a family of close combat vehicles—tanks, infantry fighting vehicles, artillery, air defense, and support vehicles, designed to reduce operating and support costs.

The Army and Air Force should review current doctrine for the heavy force battle and initiate programs to expand the close battle space at the forward line of troops [FLOT] consistent with threat developments, especially those in reactive armor, and with technical opportunities offered by advanced technology hypervelocity weapons.

Work under way now includes:

A so-called "Red Design Bureau"—a group tasked to focus intelligence estimates in order to provide the technical basis to enable us to make reasonable projections of the Soviet modernization rate for essential protection, armament and lethality, and mobility of conventional ground combat systems.

Next is a fairly comprehensive DARPA/Army program designed to extract from the laboratories essential technical improvements in two to 5 years time in order to synchronize technology availability with planned block improvements in our own conventional ground combat systems, especially the heavy force vehicle family.

How is all this going? A personal assessment, for which you asked me.

First, despite the ongoing work, there has been no change in our basic approach to the modernization problem. Year by year we review, change and rejustify everything from the ground up in the tank modernization program, for example. Meantime, there are no planned block improvement programs for the tank's combat companions—infantry vehicles, artillery, air defense, anti-armor support and so on.

The goal of a 5-year cycle for fielding new technology has essentially disappeared. To characterize, authority and funding for modernization now reside in several activities:

1. A series of Program Executive Offices (PEOs)
2. Defense Advanced Research Projects Agency (DARPA) for some R&D
3. Defense Nuclear Agency (DNA) for some R&D

4. Tank automotive command (TACOM) for automotive developments and for integration, BRL for protection and some "bullets," missile command (MICOM) for missiles (warhead requirements from Red Design Bureau).

In sum, there is no one person or agency with the requisite responsibility and authority to bring into being a coordinated, comprehensive "N-Blocked" modernization program consistent with the threat modernization rate.

Second, we now have a very good estimate of Soviet quantitative and qualitative modernization strategies and how well they have done in implementation of these strategies. We are in a favorable position to define our required rate of modernization.

Therefore, we can, with some confidence, document the parameters necessary to establish for ourselves a modernization rate competitive with that of the other side. In sum, we know what we must do to be competitive.

Third, there appears to be no consensus—certainly no visible conviction about the urgent need for block improvement programs for critical conventional ground combat systems. Not only is there no block upgrade program in place, but the Congress has not been made acutely aware of the essential need for such a program.

The Army has been, to date, unable to justify and make a strong case for such a program because of the "react to the threat" syndrome I described at the outset, and because of the need to rejustify everything, virtually from the ground up, annually.

So what must be done?

First, let's consider how to cope with the growing problem of the threat modernization rate.

The Army, it seems to me, should develop its best estimate of the quantity and quality of Soviet/Warsaw pact forces it might oppose in a central European conflict situation, should deterrence fail. Included in such a description should be an estimate which considers the three basic factors which characterize the modernization of Soviet forces. The following are:

The ready and most forward deployed component has in it about one-quarter of the total force; it is the most modern; and its complement of systems is fully modernized about every 5 to 10 years.

Second, the remaining 75 percent of the force is modernized somewhat less rapidly—perhaps every 15 to 20 years; it includes Category II and III divisions.

Third, driven relentlessly by the 5-year planning process, the Soviets field new technology in a new system about every 5 to 10 years—every other 5-year plan, and upgrade fielded systems in alternate 5-year plans.

Then, the U.S. Army should set out to modernize its ready force, say the M-10 force, about every 5 years using a programmed block improvement modernization scheme. The remainder of the force should be modernized about every 15 to 20 years. Modernization rates should be defined so as to do the following:

Ensure our best is better than his best.

Our second best is better than his second best.

Our rate of modernization (improvement) is at least equal to, and preferably better than that on the other side.

This is an affordable acquisition strategy—it is consistent with current vehicle fleet sizes and current production rates. For the deployed and deployable force (M-10) then, we must have a block improvement program with a cycle time of about 5 years.

Next, how might we cope with our laggard R&D to fielding rate? As production begins on Block "N" of a tank, infantry vehicle, artillery or air defense platform, an Anti-Tank Guided Missile (ATGM) system, or whatever, we must set in place a program that will provide choices—one or a few, for improvements to the system, which will go into production 5 years or so.

We are in this fashion serving notice on the inventors that we will go to production in 5 years, and that they therefore have about that long to get their technical house in order.

Assume, for example, that there are two armor candidates. Both will be tested and evaluated, a winner picked, and pushed into full-scale development, the losing program terminated.

The problem here is we generally keep both winners and losers going; many things are started, few if any are stopped. In the 1985 study, for example, we examined several dozen technology programs which had been funded for 15 years or more. If we can't make a winner out of a technology in 15 years, then it should be set aside.

Why don't winners transition to fielding and the losers go away?

The answer is that the losers somehow find funding. So money which could speed up the program goes to keep the loser alive; the existence of a funded alternative (loser) erodes any consensus to push the winner at the required rate; and the end result is that we pay for both and therefore can't afford enough of the one we really need.

The Congress, it seems to me, can help improve the process by asking for and understanding the choices, and by working with the Army to back the winners. Dealing with the losers will be a challenge for both the Congress and the Army.

Implementation of such a system will require that you in the Congress pursue energetically the spirit of the Goldwater Nichols Act; that is, put more money in fewer lines and vest full authority for the lines in the PEOs. This combines authority and responsibility.

Further, that authority and responsibility should include money for at least key 6.2 and 6.3A work. This would mean that at the end of technology development, choices would be competed out of the PEO organization—if the Government labs can compete in this process, so much the better; if they cannot, we likely don't need them anyway. What we desperately do need is the impetus of competition in the R&D system.

While there will inevitably be some reluctance to "let go" of this much authority to a PEO, we should recognize that there are three levels of oversight—the Army secretariat, the OSD and the Congress, to provide the necessary checks and balances.

This is the model for some of our most successful programs for missile, space and nuclear weapons programs and deployment.

How should we move to overcome our programming and budgeting impasse?

The Congress should ask for and be provided a block upgrade program for heavy force modernization—to include its armament, weapons, related missiles and lethal mechanisms.

The Congress should review the program relative to the required modernization rate. Reviewed also should be alternatives and the programs for moving choices forward in a realistic frame of time.

The Congress should concentrate its review of programs in development on the milestones established by relevant statutory and regulatory provisions for review. In other words, once it is agreed that a program has successfully passed a milestone in the prescribed process, the Congress as well as OSD should agree not to tinker with the undertaking until it reaches, or it is clear that it cannot reach, the next milestone.

Of the ad hoc management schemes set in motion to implement recommendations of the DSB study, which should be institutionalized and continued?

In my judgment, the most useful outcome of our recommendations of 4 years ago has been that set of developments conducted under the aegis of the Defense Advanced Research Projects Agency (DARPA).

Work with advanced technology penetrators and warheads, advanced armors, hypervelocity guns, work of the Red Design Bureau to improve the threat definition and projection process, work to provide competition in armor/anti-armor research programs of all types by providing a broad-based participation by industry, Department of Energy and DOD laboratories.

All that work must be continued until we have full payoff realized for the investment we have made in time, personnel and capital. How long will that take? By some estimates another three, perhaps 4 or 5 years. The argument can, and perhaps will be made that at that time DARPA should move directly back into more exotic levels of advanced research, turning ongoing work over to the Army.

It may also be argued that the transition to such an arrangement should begin as soon as possible. Contrary, I would argue that the arrangement by which DARPA brings these new armor/anti-armor technologies to technical demonstration stage and then passes them off to the program executive officer for full-scale engineering development should be formalized.

In furtherance of this drive to reach technical demonstration in an expeditious manner, the Congress should fund these programs through DARPA in multi-year funding blocks, with the specific stipulation that the purpose of so doing is to bring the modernization rate of our heavy force systems into line with what is required of us by the threat modernization rate I have already outlined.

While I realize and fully support the notion that the Nation needs an agency to pursue technologies on the far horizon, the urgency of the need to become competitive with our adversaries in the rate at which we modernize our forces demands extraordinary measures.

This is not a proposal that DARPA no longer operate on the far horizons of technology; it is, however, a proposal that recognizes we have a management crisis of considerable proportions, and that in pursuit of the DSB study recommendations, DARPA has demonstrated an ability to solve at least part of that management problem.

Will the set of recommendations I have set forth fix everything? Probably not. But they provide at least a beginning. If we correctly identified the problem 4 years ago, and I believe we did, and if our recommendations then were relevant and viable, and I believe they were, then these recommendations, if implemented, represent a modest but significant step toward providing our Armed Forces a sustained rate of modernization in conventional ground force capabilities that is consistent with the long-term performance trends of our most contentious adversary.

Thank you.

The CHAIRMAN. Thank you very much.

Dr. Richardson.

STATEMENT OF JAMES J. RICHARDSON, DIRECTOR, ARMOR/ANTI-ARMOR DIVISION, TACTICAL TECHNOLOGY OFFICE, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY, U.S. DEPARTMENT OF DEFENSE

Mr. RICHARDSON. Thank you, Mr. Chairman, Members of the committee. It is a pleasure and honor to be here today.

I would like to divide my testimony into two parts. In the first, I would like to outline the history, organization and accomplishments, of this joint program. The joint program is called the Joint DARPA/Army/U.S. Marine Corps Armor/Anti-Armor Program. I will try to shorten that in the proceeding.

The second portion of my testimony will be dedicated to the lessons learned while conducting the program. General Starry has already described the circumstances surrounding the birth of the DARPA-managed joint program.

After the "labor pains" of program planning, selecting from the nearly 400 responses to the broad area announcement and lining up technical support, the Phase 1 contracts were awarded in February 1987, 5 months after the signing of the implementing of Memorandum of Understanding (MOU) by DARPA, the Army and the Navy. An abbreviated copy of this MOU is furnished as Chart 1.

CHART 1

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF
FOR RESEARCH, DEVELOPMENT, AND ACQUISITION
WASHINGTON, DC 20310

REPLY TO ATTENTION OF

27 AUG 1986

MEMORANDUM OF UNDERSTANDING AMONG SECRETARY OF DEFENSE
UNDER SECRETARY OF DEFENSE (R&E)
SECRETARY OF THE ARMY
SECRETARY OF THE NAVY
CHIEF OF STAFF OF THE ARMY
COMMANDANT OF THE MARINE CORPS
DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

SUBJECT: Armor Anti-Armor Program

General: This Memorandum of Understanding and associated implementing instructions prescribes an agreement between the Defense Advanced Research Projects Agency (DARPA), the US Army, and US Marine Corps to enhance the armor anti-armor technology base within the United States and establish a competitive modernization rate for the long term. This agreement responds to the direction of the Secretary of Defense and the Under Secretary of Defense for Research and Engineering relative to the findings, conclusions, and recommendations of the Defense Science Board FY85 Summer Task Force on Armor Anti-Armor Competition.

Concept: The program objective is to gain and maintain a superiority in armor anti-armor technology and systems. The agreement establishes a 5-year program calling for direct competition among blue candidate technologies/components/systems and between blue candidates and red surrogates. A red design organization will design and fabricate red surrogate targets and anti-armor systems using current and alternative threat projections. Blue development organizations will compete their technologies. Independent testing and objective evaluation will ensure the quality of the competition.

Red Design Bureau: The Red Design Bureau will provide the red armors and anti-armor munitions which emulate threat protection and kill mechanisms. The Red Design Bureau will be independent of the test and evaluation activity and all blue design organizations. It will receive its direction and resourcing from the Executive Steering Committee. An Intelligence Steering Committee (DIA, Army OACSI, and USMC INTP) will support the Executive Steering Committee and will provide baseline....

Program Data: The program will begin in FY 86 and contin for 5 years. The Army and Marine Corps will each assign to DAP a program manager to provide operational, technical, and progra management for the program. The recommended funding profile is

	FY86	FY87	FY88	FY89	FY90
DARPA	30M	40M	60M	60M	60M
ARMY	7M	18M	25M	30M	30M
USMC	2M	4M	6M	10M	10M

Review: Two levels of review will be undertaken. The Sen Review Committee will focus on policy and progress toward the major objective, namely, gaining and maintaining superiority in the armor anti-armor competition with the Soviets. An Executiv Steering Committee will be responsible for providing guidance a resourcing to the Red Design Bureau and the Independent Managem Activity. The Executive Steering Committee will also specify t evaluations to be accomplished by the Independent Assessment Gr

A detailed set of implementing instructions is appended to this MOU (TAB A). These instructions clearly specify and defin relationships among the organizations involved.

Secretary of the Army

Secretary of the Navy

Under Secretary of Defense
Research and Engineering

Chief of Staff of the Army

Director, Defense Advanced
Research Projects Agency

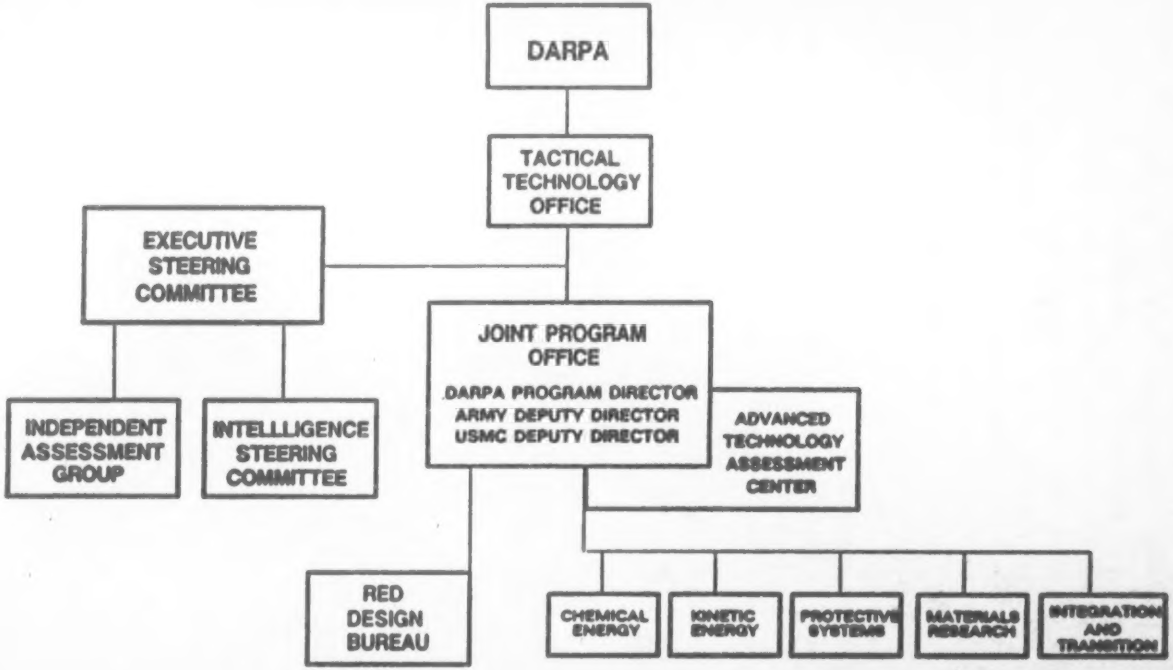
Commandant of the Marine Corps

I would direct your attention to the upper right-hand corner. That describes the funding levels over the 5 years covered.

Management of the joint program resides in DARPA's Tactical Technology Office, with a DARPA program director and Army and USMC deputy directors, as shown in Chart 2. An Executive Steering Committee, co-chaired by DARPA and the Army, provides oversight. Two subsidiary committees conduct independent assessments of progress in the areas of threat development and technology.

CHART 2

ARMOR ANTI–ARMOR PROGRAM ORGANIZATION


DARPA
TACTICAL TECHNOLOGY OFFICE
EXECUTIVE STEERING COMMITTEE
JOINT PROGRAM OFFICE
DARPA PROGRAM DIRECTOR
ARMY DEPUTY DIRECTOR
USMC DEPUTY DIRECTOR
INDEPENDENT ASSESSMENT GROUP
INTELLLIGENCE STEERING COMMITTEE
ADVANCED TECHNOLOGY ASSESSMENT CENTER
RED DESIGN BUREAU
CHEMICAL ENERGY
KINETIC ENERGY
PROTECTIVE SYSTEMS
MATERIALS RESEARCH
INTEGRATION AND TRANSITION

A key theme of the joint program is competition among the industrial blue teams. Competing technologies are tested at an entity called the Advanced Technology Assessment Center. Los Alamos National Laboratory was chosen to serve in this role. The Albuquerque Operations Office of the Department of Energy (DOE) was selected as the contracting agent.

These choices seemed to substantiate the opinion of the Defense Science Board that there are considerable resources in the Department of Energy which could contribute to this effort.

The Defense Science Board identified a need for insulation of the threat projection process from U.S. design and technology trends. The Red Design Bureau was formed to fill this need.

A strong team of scientists and engineers with an understanding of how the Soviets employ technology was separated from the rest of the program and set to the task of defining armor and munition threats for Phase 1 (1995), and Phase 2 (2000+) timeframe.

In order to qualify each design, the technology and methods must be shown to be Soviet. It must also be proven that the final threat designs can be integrated into plausible Soviet tanks, guns and missiles.

Industrial "blue teams" were selected to develop advanced chemical energy warheads, vehicle protection systems and kinetic energy penetrators. Chart 3 lists some of the principal contractors.

Chart-3- p 21

ARMOR ANTI-ARMOR PROGRAM CONTRACTORS - CHART 3

ADVANCED TECHNOLOGY ASSESSMENT CENTER
- Los Alamos National Laboratory

RED DESIGN BUREAU
- Battelle Memorial Institute
  - Subs: General Motors, Hughes, S Cubed

ARMOR
- Alcoa
- Honeywell
- DuPont
- FMC

CHEMICAL ENERGY
- Lawrence Livermore National Laboratory
- Physics International
- Nuclear Metals, Inc.
- Aerojet Ordnance

VEHICLE SURVIVABILITY
- General Motors/Delco
- General Dynamics
- General Electric
- AAI Corp.

KINETIC ENERGY
- Hercules
- AAI Corp
- Kaman Sciences
- General Research Corp.
- California Research Corp.

Testing and evaluation of these products—and they are coming out now as we speak, are coming out at the Advanced Technical Center, Los Alamos. Help to the contractors is being provided by the Army, USMC and DOE national laboratories.

Technology base work was begun in order to expand our design options as well as to develop a better understanding of the phenomenological basis for the improvements being sought.

Again, this addressed recommendations by the Defense Science Board. Experimental and analytical work is being conducted in penetration mechanics, warhead and armor design, materials sciences and other areas of research by industry and Los Alamos, Lawrence Livermore and Sandia National Laboratories and others.

Integration and transition has been a major thrust for over a year.

It doesn't do us any good to produce things if they don't have any place to go, resulting in a number of opportunities to place our products in Army and USMC weapons systems.

The Army's recent efforts to define the armor/anti-armor improvement path over the next 20 years have made this goal much more viable. More than anything else, these clear-cut guide posts have allowed this program and, in fact, industry in general, to participate more fully in the process. One result is an increased willingness on the part of industry to put their money into the game.

For a little over 2 years, DARPA, the Army and the Marine Corps have worked under this management and functional structure with approximately 120 contractors, three national laboratories, several universities, and a number of Army and Navy research and development agencies.

CHART 4

ARMOR/ANTI-ARMOR JPO FUNDING SUMMARY

FUNDING SUMMARY FOR FY86 THROUGH FY89

FUNDING SOURCE	TOTAL FUNDS RECEIVED
DARPA FUNDS	144,000
DARPA BTI	35,500
DARPA NUNN	2,500
US ARMY FUNDS	62,000
US MARINE CORPS FUNDS	9,520
TOTALS	251,020

	FUNDS DISTRIBUTION
PROGRAM	TOTAL FUNDING COMMITTED
CHEMICAL ENERGY WARHEADS	32,495
KINETIC ENERGY	36,283
VEHICLE PROTECTION	61,215
INTEGRATION & TRANSITION	8,216
MISSION KILL	2,000
RED DESIGN BUREAU	26,300
TECH. BASE	49,650
LOS ALAMOS NATIONAL LAB	34,861
NUNN	2,500
TOTALS	251,020

Chart 4 shows the source and distribution of the funding. We are spending approximately $90 million per year from DARPA, Army, Marine, BTI and Nunn program coffers. The Joint Program Office disburses this funding among the Army and USMC R&D agencies and the DOE (which contracts with industry, universities and national laboratories).

With the understanding that security considerations prevent me from going into detail, let me briefly discuss the benefits being derived from these expenditures. Chart 5 lists some of the most important of these.

SOME ACCOMPLISHMENTS OF THE A3 JPO-CHART 5

- RED DESIGN BUREAU
  - DEMONSTRATED SOVIETS COULD DESIGN ARMORS WITH SIGNIFICANTLY INCREASED PENETRATION RESISTANCE
  - DESIGNED, DEMONSTRATED 1992-1997 SOVIET CE AND KE ANTI-TANK MUNITIONS
  - DELIVERED OVER 130 THREAT ARMORS AND MUNITIONS FOR BLUE TEAM TESTING
- CHEMICAL ENERGY WARHEADS
  - DESIGNED, BUILT TESTED BEST DEVELOPMENTAL TANDEM (DOUBLE) WARHEADS AVAILABLE
  - TESTED ADVANCED EXPLOSIVLEY FORMED PENETRATORS
  - DEVELOPED INNOVATIVE DEFEAT MECHANISM FOR REACTIVE ARMOR
- KINETIC ENERGY PENETRATORS
  - EXTENDED EFFECTIVE RANGE TANK ROUNDS DESIGNED
  - ADVANCED PENETRATOR RESEARCH FOR FUTURE HIGH VELOCITY LAUNCH
  - NOVEL PENETRATORS INVESTIGATED
- SURVIVABILITY ENHANCEMENT
  - DEVELOPED CIVILIAN ARMOR INDUSTRY WITH MANY IDEAS, ENLARGED TECHNICAL BASE
  - DELIVERED HIGH EFFICIENCY ARMOR TARGETS - WORKING ON ADVANCED DESIGNS
  - PROGRAM SYNCHRONIZED WITH ARMY HEAVY FORCE MODERNIZATION PLAN
- TECH. BASE
  - LOW COST ARMOR MATERIAL PROCESSING TECHNIQUES
  - VERY ACCURATE 3D HYDROCODE INPLEMENTED
  - LOW FLAMABILITY EXPLOSIVE FOR REACTIVE ARMOR

The Red Design Bureau (RDB) has designed, built and tested armor targets representative of a Soviet threat of significantly increased penetration resistance over those available to the Defense Science Board in 1985. Things have gotten worse in this category.

These surrogates allow a much more comprehensive look at Soviet options. The RDB also developed, built and tested realistic

1992–1997 Soviet surrogate kinetic energy and chemical energy munitions. They delivered 92 heavy armor targets and 40 Soviet surrogate munitions, which are being used to test our blue team products at Los Alamos.

They have been tested against some very wholesome munitions and armor. This testing is being conducted right now, as a matter of fact, at Los Alamos.

In addition, the Red Design Bureau has contributed to a number of important threat investigations conducted outside of this program. At the Army's request, the entire RDB will transition to the Army in 1991. That has to be worked out.

The chemical energy blue teams delivered the best developmental warheads available. They had little difficulty defeating the threats identified by the DSB in 1985 but could not penetrate the Red Design Bureau armors.

After being allowed time for redesign, the first (of three) retested has defeated these extremely tough armor surrogates. We are currently transferring two of the Phase 1 warheads into Army systems. Phase 2 will begin in June following a downselection from over 50 proposals. That downselection is occurring now and chemical engineering and armor.

In the meantime, an innovative reactive armor defeat mechanism has been demonstrated and will be pursued through a cooperative program with the United Kingdom. Other advanced concepts, to include advanced liner materials, are being demonstrated under a program managed by Lawrence Livermore National Laboratory.

In kinetic energy, we performed the first electromagnetic gun launch of a tactical "bullet." Electromagnetic guns have usually fired, up to this time, plastic pellets. We have fired a scaled version of this projectile. Designed for hypervelocity, flight reached 3.4 KM/S. Scaled segmented rod experiments verified predicted performance versus velocity.

Other novel penetrator concepts are being investigated as well. In Balanced Technology Initiative (BTI) funded effort, two boosted and guided tank projectile concepts were designed to extend tank gun effective range. These are undergoing component definition and validation.

In armor, U.S. industry has never been funded to compete with the Army's laboratories. We have supported four contractor teams for nearly 2 years to improve their technology base and then to design armors.

The Phase 1 targets are being tested at this time. They are credible, high-efficiency armors, but fall short of the best that the Army's Ballistic Research Laboratory has produced. Within the next few months, however, we will be testing the blue teams' advanced armors, which we believe will yield exciting results. These armors will be considered by the Army in their heavy force modernization program Block II requirement and will serve as a baseline for the Marine Corps advanced amphibious assault vehicle.

In addition, we are currently pursuing three Nunn programs cooperative; international in armor with the Governments of France, the United Kingdom and Germany.

There has also been significant component and materials work done such as a demonstration of flame-retardant, sheet explosive for reactive armor and a low-cost ceramic processing technique.

Phase 2, which will begin in the next quarter, will target Block III and other transition windows. Industry has shared much of the cost of the Phase 1 work. They have come very far, very fast, and will be an important force in improving vehicle survivability.

There are areas of work being done at DARPA which are related to, but not included under, the umbrella of the joint program. There is a mine/countermine effort directed toward networking conventional mines, developing anti-helicopter mines and providing countermine development and demonstrations.

There is the short-range, shoulder-fired, anti-tank weapon which is BTI-funded and is directed at the development of an anti-tank missile which can be shoulder-fired.

The time is past when warheads, penetrators or armor can be attached to the weapon system and forgotten. They must be modular and improved through sustained R&D efforts. In this pursuit we have continually polled industry, DOE, universities and Government for ideas.

In addition, the independence of testers and evaluators, as well as those involved in threat prediction, introduces objectivity and new views into those important functions. The contracting process is of utmost importance in maintaining the quick response and flexibility to optimize the contracted tasks to the goals and, of course, the increased funding provided by this program was crucial.

From within its budget, DARPA shifted an additional $300 million, over the last 4 years, into armor/anti-armor. Perhaps, the most important factor for success, however, is the increasing cooperation with the services. We have incorporated talent and ideas from wherever they were available. Every proposal downselection has included DARPA, Army and Marine personnel. We have all worked together cooperatively to bring the program to this stage.

CONCLUSIONS CHART 6

1. SUCCESSFUL PROGRAM - WHY?

0 NEW TALENT FROM INDUSTRY AND DOE ENGAGED $300
0 INCREASED A3 FUNDING FOR 1986-1990 (OVER ~~$150~~M)
0 SEPARATE/DEDICATED TEST AND EVAL. AND THREAT FORECAST
0 FAST TRACK PROCUREMENT USED WHEN POSSIBLE
0 JOINT MANAGEMENT FOSTERED BEST FROM EACH PARTICIPANT
    + DARPA ABILITY TO ENGAGE INDUSTRY
    + ARMY TECHNOLOGY AND SYSTEMS EXPERTISE
    + COOPERATION IN TRANSITIONING PRODUCTS

2. HOWEVER, THIS KIND OF PROGRAM SHOULD BE THE EXCEPTION

0 CRITICAL PROBLEMS NEEDING NEW IDEAS
0 IMPORTANT, WELL DEFINED GOALS
0 ADEQUATE FUNDING, TEST FACILITIES, AND OTHER RESOURCES
0 CLEARLY DEFINED RESPONSIBILITIES

3. FUTURE PLANS

0 PRODUCT TRANSITION UNDERWAY
0 TRANSITION OF METHODOLOGY IS MORE DIFFICULT
    + SOME AREAS UNDERWAY
    + TOO SOON FOR DARPA TO PULL OUT
0 DARPA/ARMY/USMC CONTINUE, ~~OVER NEXT 2 YEARS -~~ PHASE TRANSITION INTO ARMY SYSTEM

I believe that these conclusions, listed on Chart 6, are generally necessary for success in conducting programs of this kind. I also believe that this approach to managing a program should be adopted sparingly. It is a difficult and transient process to be employed only for clearly defined goals stemming from critical problems. It demands special handling and streamlined operations—in a word, "emphasis."

Normalization would eliminate that emphasis, leaving the responsible agency with tough problems without the special mechanisms needed to bring about solutions.

Where do we go from here? The program should certainly be continued until full payoff is received from the investments we have made in personnel and facilities, or until further progress seems unlikely.

Time is needed to take advantage of our ongoing efforts. After that, DARPA's traditional role of pursuing special high technology projects will go on, but the management of armor/anti-armor must be vested with the Army.

Hopefully, by that time a number of products, technologies and techniques will have transitioned to that service. The challenge, however, is to transition the link to industry and the DOE national laboratories.

Clearly, the Army is using industry more in this area today than when the DSB met in 1985. The intent to incorporate the Red Design Bureau is just one indication of this trend.

Opportunities offered by the weapons systems managers for competitive selection of armor development by industry is another. During the next few months, we will be working to make this final transition happen.

The CHAIRMAN. Thank you, Dr. Richardson.

General Pihl.

STATEMENT OF LT. GEN. DONALD S. PIHL, MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT AND ACQUISITION

General PIHL. Thank you.

Good morning, Mr. Chairman and Members of the committee. It is a pleasure for us to appear before your committee to discuss armor/anti-armor.

Armor/anti-armor is not a new subject area. While in the past it may have been addressed as separate components, that is tanks and anti-tank weapons, today advances in technology have broadened the evolution of these systems into an indivisible equation which we call armor/anti-armor.

Last year, before the Senate Armed Services Committee, I testified that it was clear that in the armor/anti-armor arena we were now behind. Today we are still behind. However, I believe we have arrested the technological insufficiencies resulting from the Soviet advances and are pursuing a decisive course of action which will ultimately provide us a decided advantage in this crucial area.

Armor/anti-armor is the title we have given to the process of catching-up, achieving overmatch, and eventually staying ahead of Soviet armor/anti-armor developments. In support of this process, the Army has developed a family of modernization plans, five of which are directly related to armor/anti-armor.

First, there is the A3 (Armor/Anti-Armor) Modernization Plan which is a functionally-oriented plan to improve warfighting capability for the total Army in the near, mid and far term.

Second is the Heavy Force Modernization Plan to modernize our heavy forces. Third is the Army Aviation Modernization Plan which addresses helicopter anti-armor capability. Fourth is the Fire Support Modernization Plan which addresses all artillery systems and missions, to include counterfire which was a major concern of the 1988 Defense Science Board summer study on countering Soviet fire support systems. Finally the Technology Base Master Plan which focuses technology on the armor/anti-armor issue.

Last year my request to the Congress was for increased funding to help meet our shortfall in the A3 requirement. I am thankful to the Congress for the support which followed. This year our budget request contains the funds which we consider essential to redressing our insufficiencies and executing the plans I have just described.

In that request in the Reagan bill for 20 billion, we will spend $5 billion in the armor/anti-armor arena.

Let me now address some of the specific actions we have taken, and those we plan to take regarding some of our major systems.

In 1988, our Chief of Staff, General Vuono, chartered the Armor/Anti-Armor Special Task Force. Its Chief, Colonel (Promotable) Tom White, is with me today.

The key deliverable of this task force is the A3 Mod Plan which I have mentioned. They will also develop a transition plan to pass responsibility for A3 modernization to the Army staff.

One of the Army force modernization principles adopted by the task force is the overriding need for continuous modernization of the "first to fight" units at a rate competitive with expected Soviet modernization.

In sum, we must modernize Force Package I at a 5 to 6-year pace to counter the Soviets' complete modernization of their strategic echelon, which occurs at a 7-year pace; thus, our plans maintain a qualitative edge in our "first to fight" units.

By then using displaced equipment to subsequently upgrade Force Packages II and III, we continually modernize our total force inside the Soviets' modernization cycle.

The 1987 Defense Science Board [DSB] summer study on technology base management found that DOD and industry are deficient in rapid technology transition into systems and products. It went on to say that this situation is a primary contributor to the growing crisis in military competition as Soviet weapons system performance approaches and, in some cases, exceeds that of the U.S. and our allies.

In the armor/anti-armor arena, this fact was clearly pointed out by the 1985 Defense Science Board task force which was co-chaired by General Donn Starry. Because we can anticipate general numerical inferiority relative to the Eastern Block, the situation could be disastrous unless the problem is corrected or reversed by our technological advantages.

We cannot, nor should we, match the Soviets weapon for weapon or dollar for dollar. However, we must achieve and maintain a credible military force capable of carrying out our worldwide missions.

The greatest opportunity to accomplish this objective is to rapidly accelerate the transition of technology to existing or emerging systems. To continue to perform material acquisition in the old heel-to-toe fashion would result in the development time being extended several years and the cost substantially higher than by preceding full-scale development with an advanced development phase consisting of Advanced Technology Transition Demonstrators (ATTDs).

In support of this approach, we will focus our technology base to maximize efficient utilization of resources to accelerate demonstrations of critical technology.

Given the emerging and growing threat and dollar constraints, we cannot afford to do "business as usual" as we go about the modernization of our vital ground combat forces. Recognizing this fact, and because it is an intuitively smart thing to do, we have entered into a memorandum of agreement with DARPA and the Marine Corps which provides for a joint technology program in armor/anti-armor.

This program's objective is to enhance the armor/anti-armor technology base in the U.S., to include industry and the DOE national labs, and to provide a competitive mechanism to encourage application of that knowledge to products that advance the U.S. military capabilities relative to those of the Soviets.

Dr. Richardson's and General Starry's presence here with me today are evidence of our resolve to solve the armor/anti-armor problem.

One of the enduring strengths the United States enjoys over potential adversaries is the existence of a broad, high-quality, innovative private industrial sector. Were we to rely only on Government R&D centers, capable as they are, we would deny ourselves this tremendous advantage.

Therefore, industry will be involved as a partner with Government through open competition at each stage of the heavy force modernization program. While we will not ignore approaches based on conventional wisdom, innovative solutions will be encouraged for the next generation of vehicles.

Contracts will be performance-oriented in order to challenge industry to provide the best, most cost-effective solutions to Army requirements. It is through the competitive process that we hope to achieve innovative answers to Army requirements which might otherwise not come about.

Finally, we will be proactive. Were we to adopt the philosophy of waiting for the optimum solution, we would make no progress at all, indeed, we would fall further behind.

The Soviets pursue a steady, redundant, evolutionary modernization program which improves fielded systems and produces new systems on a regular basis. In order to keep up with the threat, much less to turn inside it, we must have a dynamic modernization program of our own that continuously improves our war-fighting capabilities.

We can accomplish this goal with the Aviation, Heavy Force, Fire Support and Technology Base Modernization Plans. With your help and support, we will provide our Army with what is needed for it to continue to serve as a viable deterrent and to be ready, should it be called upon to protect our Nation's vital interests.

Gentlemen, we are ready for your questions.

PREPARED STATEMENT OF GENERAL PIHL

Good morning Mr. Chairman and members of the committee. It is a pleasure for us to appear before your committee to discuss Armor Anti-Armor or A3 as we call it.

A3 is not a new subject area for the Army. While in the past it may have been addressed as separate components, that is tanks and anti-tank weapons, today advances in technology have broadened the evolution of these systems into an indivisible equation which we call Armor Anti-Armor.

Over the past decade the U.S Army, with the support and assistance of the Congress, has pursued the largest peacetime modernization program in our history. We have drastically increased our warfighting capabilities. During the same period the Soviets have been engaged in an even more aggressive modernization effort. In comparison to what we have fielded, they have turned out almost nine times as many artillery pieces, five times as many surface to air missiles, over three times the number of tanks and twice as many helicopters. While this has resulted in even further increases in their numerical superiority, they, more importantly, have reduced and in some cases reversed the qualitative advantage we had held. This was pointed out quite clearly by the 1985 Defense Science Board Task Force, co-chaired by General Starry, which assessed the status of Armor Anti-Armor between the U.S. and the Soviet Union.

Last year, before the Senate Armed Services Committee, I testified that it was clear that in the Armor Anti-Armor arena we were now behind. Today we are still behind, however I believe we have arrested the technological insufficiencies resulting from the Soviet advances and are pursuing a decisive course of action which will ultimately provide us a decided advantage in this crucial area. This imperative takes on even greater importance in the face of the Intermediate Nuclear Forces Treaty. While we certainly applaud this step and support further continued efforts to reduce nuclear weapons, there is no question that these result in higher premiums being placed on conventional land forces.

Armor/Antiarmor is the title we have given the process to catch-up, achieve overmatch, and eventually stay ahead of Soviet armor/antiarmor developments. In support of this process the Army has developed a family of modernization plans, five of which are directly related to Armor Antiarmor. First, there is the A3 Modernization Plan which is a functionally oriented plan to improve warfighting capability for the Total Army in the near, mid and far term. Second is the plan to modernize our Heavy Forces which is a subset of the total A3 plan. Third is the Aviation Modernization Plan which addresses helicopter antiarmor capability. Fourth is the Fire Support Modernization Plan which addresses all artillery systems and missions, to include counterfire which was a major concern of the 1988 Defense Science Board Summer Study on Countering Soviet Fire Support Systems. And finally the Tech Base Master Plan which focuses technology on the armor antiarmor issue.

Last year my request at the Senate Armed Services Committee hearing was for increased funding to help meet our shortfall in the A3 requirement. I am thankful to the Congress for the support which followed. This year our budget request contains the funds which we consider essential to redressing our insufficiencies and executing the plans I have just described. I ask your support in sustaining this level of funding.

Let me now address some of the specific actions we have taken, and those we plan to take regarding some of our major systems. In 1988 our Chief of Staff, General Vuono, chartered the Armor Anti-Armor Special Task Force: its' chief, Colonel Promotable Tom White, is with me today. The key deliverable of this task force is the A3 Mod Plan which I have mentioned: they will also develop a transition plan to pass responsibility for A3 modernization to the Army Staff. One of the Army force modernization principles adopted by the task force is the overriding need for continuous modernization of the "first to fight" units at a rate competitive with expected Soviet modernization. In sum, we must modernize Force Package I at a 5 to 6 year pace to counter the Soviet's complete modernization of their strategic echelon, which occurs at a 7-year pace; thus, our plans maintain the qualitative edge in our "first to fight" units. By then using displaced equipment to subsequently upgrade Force Packages II and III we continually modernize our total force inside the Soviets' modernization cycle. This warfighting imperative demands a well focused technology base which provides technology packages ready for system development every 5 to 6 years. Concurrently, this approach requires full scale engineering development (FSED) of a new or block improved system so that it is ready to be fielded at the same frequency. Finally, the strategy requires a constant, or level, quantity of procurement funding so as to buy-out quantities needed to equip top priority units every 5 to 6 years.

Recognizing the need for an international approach to the Warsaw Pact threat, the United States actively participates on a Close Combat Armaments Panel which is under the direction of the NATO Army Armaments Group. This panel focuses on armor antiarmor programs. In addition, the U.S. has numerous ongoing Data Exchange Agreements worldwide which focus on armor protection, armament development, anti-tank missiles and, of course tank armaments ammunition. Most notable of these are our agreements with the United Kingdom and the Federal Republic of Germany. As you might expect, many of our bilateral exchanges deal with very sensitive technologies and are therefore classified.

Turning to specific hardware adjustments we have made, first and foremost we have increased the procurement goal for our most modern tank killing systems. We will continue to procure the M1 Abrams tank well beyond the original quantities we had sought (in excess of 9000 vice the previously planned quantity of approximately 7000); the M2 Bradley Infantry Fighting Vehicle and the M3 Cavalry Fighting Vehicle, and the AH64 Apache Helicopter will also continue in production.

Second, we are improving the lethality of the kinetic energy tank bullets and the chemical energy missiles, both TOW on Bradley and Hellfire on Apache. For the M1 tank we now have a 120mm smooth bore gun with a depleted uranium long rod penetrator which improves kill performance. Soviet reactive armor is designed to protect against chemical energy missiles and offers only its mass as protection against kinetic energy bullets. This means that the explosive in a reactive armor box, while effective against unitary missile warheads in older TOW and Hellfire, will not stop our best tank bullets.

For our chemical energy missiles we have a range of ongoing aggressive activities. TOW 2A is a switch to tandem warheads. The precursor charge causes the reactive armor to explode without harming the main warhead chemical energy "jet" formation. The jet, once formed, proceeds through the area behind the reactive armor box and defeats the target. Also for TOW, we are developing TOW 2B which is a top attack weapon that will avoid the thicker frontal aspects of the target. For Hellfire we are installing a precursor charge like TOW 2A in order to spoof the reactive armor into firing while the Hellfire "jet" defeats the target tank.

While these current adjustments to our tank, infantry, and aviation capabilities are ongoing, we are also developing a key system for the light forces dismounted soldier.

The Antiarmor Weapon System-Medium (AAWS-M) is a key force multiplier. AAWS-M is the missile which replaces the outdated DRAGON and will kill a modern tank by employing a top attack kill mechanism. We have selected a system using fire and forget technology and will move into full scale engineering development this year. At less than 45 pounds, this single-man employable system is invaluable to our light forces and will also be used to thicken the heavy forces since it will be with Bradley crews for use in built-up areas, woods, and close terrain. The AAWS-M is capable of launch from an enclosure and will solve the Army's requirement for military operations in urban terrain (MOUT).

Having outlined the actions to solve armor/antiarmor insufficiencies, let me elaborate on our modernization strategy. The threat has not stopped the modernization of its conventional forces. In addition to product improvements like reactive armor, the Soviets continue to field a new design tank every 7 to 8 years. To counter this fielding cycle and with full focus on affordability, we will modernize our forces by thirds, as I previously stated. This means our "first to fight" forward deployed heavy forces need to receive modernized equipment roughly every five years and their systems refurbished and given to forces that deploy to the war in later stages.

Key to modernizing the heavy forces are the preplanned product improvements to the Abrams tank called Block II and the product improvements to Bradley survivability which are an outgrowth from live fire testing. The Block II tank improvements (M1A2) increase the warfighting capability of the tank by freeing the commander to hunt for targets independent from the gunner. The crew will perform this "hunter-killer" function utilizing the improved commander's weapon station and the commander's independent thermal viewer. The rate at which the Abrams Block II will find and kill targets is increased because the current fire control computation devices are replaced by a modern high speed data bus (1553) with signal processing, data display screens and electronics control units that rapidly compare and show the fire control solution to the commander and gunner. The full vehicle data base is redundantly stored in the hull and turret of the tank as a means to increase protection from live fire. The Block II improvements also change the rangefinder technology. We will introduce a rangefinder that is on par with the forward looking infrared (FLIR) sight at the gunner's and commander's position. If we can see the target, we will be able to range to it. Finally, Block II improves survivability by increasing armor protection and by rewiring the tank to reduce its vulnerability to live fire. Block II is programmed for fielding by 1992 in order to be in place before the Future Soviet Tank II (FST II).

Having established the modernizing by thirds concept and the Block II tank as a starting point, an explanation of the refocus of the technology base to support Heavy Force Modernization is appropriate. Basically, the Army intends to execute an innovative acquisition strategy to field a heavy force with maximum warfighting capability, within affordable resource limitations, and to do so before the threat's research, development and acquisition cycle will permit them to react. To do this our management must be characterized by extreme creativity; we must adopt unique, procedures while following thorough management practices prescribed in the DOD acquisition regulations. Throughout this endeavor we must be faithful to the R&D process and be willing to accept a degree of developmental risk. We will focus our tech base, accept and adopt the realities of the day while pursuing the possibilities of the future, and above all, accelerate the pace of technology insertion. We will capitalize on the economies and flexibility of commonality, rely on the innovativeness resulting from open competition in the private industrial sector, and, most importantly, we will be proactive.

Let me expand on each of these points. The foremost unique management practice to be employed in the development of the systems in the Heavy Force Modernization is the use of Advanced Technology Transition Demonstrators (ATTD's) in lieu of performing Demonstration/Validation phases.

The 1987 Defense Science Board (DSB) Summer Study on Technology Base Management found that DOD and industry are deficient in rapid technology transition into systems and products. It went on to say that this situation is a primary contributor to the growing crisis in military competition as Soviet weapons' system performance approaches and, in some cases, exceeds that of the U.S. and our Allies. Because we can anticipate general numerical inferiority relative to the East Block, the situation could be disastrous unless the problem is corrected or reversed by our technological advantages. We cannot, nor should we, match the Soviets weapon for weapon or dollar for dollar; however, we must achieve and maintain a credible military force capable of carrying out our worldwide missions. The greatest opportunity to accomplish this objective is to rapidly accelerate the transition of technology to existing or emerging systems. The DSB recommended careful selection and timely execution of systems and major sub-system ATTD's to build and test experimental systems in a field environment. To continue to perform materiel acquisition in the old, heel-to-toe fashion would result in the development time being extended several years and the cost being substantially higher, than by preceding FSD with an Advanced Development Phase consisting of ATTD's. Given the emerging and growing threat and dollar constraints, we cannot afford to do "business as usual" as we go about the modernization of our vital ground combat forces.

In support of this approach we will focus our tech base to maximize efficient utilization of resources to accelerate demonstrations of critical technology. This will provide necessary information on technology maturity, integration issues and operational potential of competing technologies. Additionally, we are not going it alone; we have entered into a Memorandum of Understanding with DARPA and the U.S. Marine Corps which provides for a five year joint technology program in armor antiarmor. This program's objective is to enhance the armor antiarmor technology base in the U.S., to include industry and the DOE national labs, and to provide a competitive mechanism to encourage application of that knowledge to products that advance U.S. military armor antiarmor capabilities relative to those of the Soviets. Intuitively, this is a smart thing to do. The threat seen for the remainder of the 20th century and beyond demands action today within existing technological capability.

In order to approach the reality of the projected fielding of the Future Soviet Tank II (which will be a very tough and lethal target) we have Abrams Block II. Beyond FST II will be a "turn of the century tank which we will counter with Block III. To meet that and other threats we are putting together a plan to modernize our heavy force by developing a family of six vehicles which will, when fielded, solve our key heavy force insufficiencies between now and 2005. The companion driver to future Soviet tanks is the reality of Soviet artillery. We are outgunned, outranged, outdone in throw weight, and face massive Soviet preparatory fires in any future central battle. Therefore, the Heavy Force Modernization Plan treats not only the tank but the other parts of the combined arms mounted force that need to materialize between now and the year 2000.

We have selected six vehicle concepts for technology demonstration and competitive development. They are the tank, the infantry fighting vehicle, the howitzer, the combat mobility vehicle, the line of sight antitank system, and the ammunition resupply vehicle. For our purposes here today I will discuss only the Block III tank and the Line of Sight Anti-tank or LOSAT.

We have programmed into the Heavy Force Modernization Plan a range of options for the decision maker. The concept is to develop a common heavy chassis with special armor protection for the tank, the infantry vehicle, the howitzer and the combat mobility vehicle. For the line-of-sight antitank and ammunition resupply vehicles, we will employ the current Bradley chassis with medium armor protection.

In order to flesh out the Heavy Force Modernization Plan concept, we start with the tank. The tank that follows Abrams Block II can either be a third block of product improvements to the M1 or a new tank. Whether or not it is a Block III to the current chassis or a new tank, we need to start fielding such a machine by 1997 in order to offset FST III. Utilizing the Milestone V product improvement program apparatus of the DoD

Acquisition Directives allows for timely fielding and causes the same level of oversight and DoD decision as a Milestone I new start. The benefit in utilizing a Milestone V approach is the reduction in program documentation and the streamlining of the process by elimination of heel-to-toe development if a new start is imposed. In either case, the improvements to the tank envisioned are a new gun, countermeasure technologies, autoloader, advanced power pack, improved track and suspension, weight reduction (from 70 tons to a 55 ton goal) and introduction of modular armor to improve survivability.

The chassis development for Block III has two dimensions. First, we have always planned to upgrade the tank beyond Block II. That is why there is a test bed Abrams chassis at the TACOM laboratory where the various turrets and fighting compartments can be demonstrated. In parallel to the test bed is competitive development of the Advanced Technology Transition Demonstrators (ATTD), where the three contractor teams that supported the AFV Task Force can now shift their work. eventually, the fighting modules from the test bed will be integrated into the chassis from the technology demonstrator as each vehicle takes shape.

It takes roughly 1000 armored systems to modernize a heavy division counting floats and war reserve. Within a level funded Weapons and Tracked Combat Vehicle (WTCV) Appropriation, one can balance program affordability by varying the quantity of vehicles to be produced based on the expense of the mission module (turret or fighting compartment). The Army has a major choice yet to be decided. We can either move all of our heavy armored vehicle work into our remaining government owned tank production facility and vary the mission equipment produced in commercial facilities, or move the common heavy chassis to a commercial facility where the company which wins the competitive contract can integrate the chassis and mission equipment and deliver it to the Army. There are sides to both concepts, i.e. level funding control in a sole source environment versus competition. Under the full competition scheme is the risk of the vehicle not being a model choice within a production run but rather a system which can be killed as a budget line item. Under either choice there is a major change ahead for the country in the way which we develop and procure armored vehicles in order to modernize our heavy forces.

Before discussing the medium chassis, upon which the Line-of-Sight Antitank or LOSAT will be based, there is clarification needed on our plans to modernize chemical energy missiles beyond TOW and Hellfire. First let me begin by describing the linkage between AAWS-Medium and AAWS-Heavy both of which are in research and development with the medium furthest along (entering full scale engineering development). The winning technology from the AAWS-M development can be grown into a longer range heavy version of the medium antiarmor weapon system. The reason we have pursued medium before heavy is that DRAGON is in immediate need of replacement and there is significant growth left in TOW (TOW 2A and TOW 2B). When the FIFV is designed, the Army will have the option of employing AAWS-M from FIFV or developing a missile which has taken the name the Advanced Missile System-Heavy or AMS-H. The name AAWS-H was previously taken and had three components: (1) the Kinetic Energy Missile (KEM) which is also known by a contractor name Hypervelocity Missile (HVM), (2) the Fiber Optic Guided Missile or FOG-M which is a non-line of sight air defense missile applied in an antiarmor role, and (3) the replacement for TOW 2 or AMS-H.

It is easier to clarify how these all fit by sticking with the flow of weapons systems over time. The KEM on a Bradley chassis is the Line of Sight Antitank or LOSAT dedicated antitank weapon. It will replace the Improved TOW vehicle which is a M113 carrier with a TOW pod that preceded the Bradley and is still in the dedicated antitank companies of the heavy force. The flow then is TOW 2 A & B on Bradley followed by LOSAT with KEM to replace ITV, followed by FIFV with AMS-H or a version of AAWS-M to eventually replace Bradley in the forward deployed units. The

FOG-M in an antiarmor role is covered by tasking BG Bob Drolet, the Program Executive Officer for Air Defense, to evaluate FOG-M in an antiarmor role. This non-line-of-sight air defense system when ordered could join the antiarmor battle when the commander decided this is doable given the lack of enemy air. In summary.

NOW	FUTURE
M901 ITV	LOSAT w/KEM
Bradley w/TOW	FIFV w/AMS-H or AAWS-M

A chart depicting Armor Anti Armor is shown below. The six systems in Heavy Force Modernization package 1 are shown in the darkened boxes.

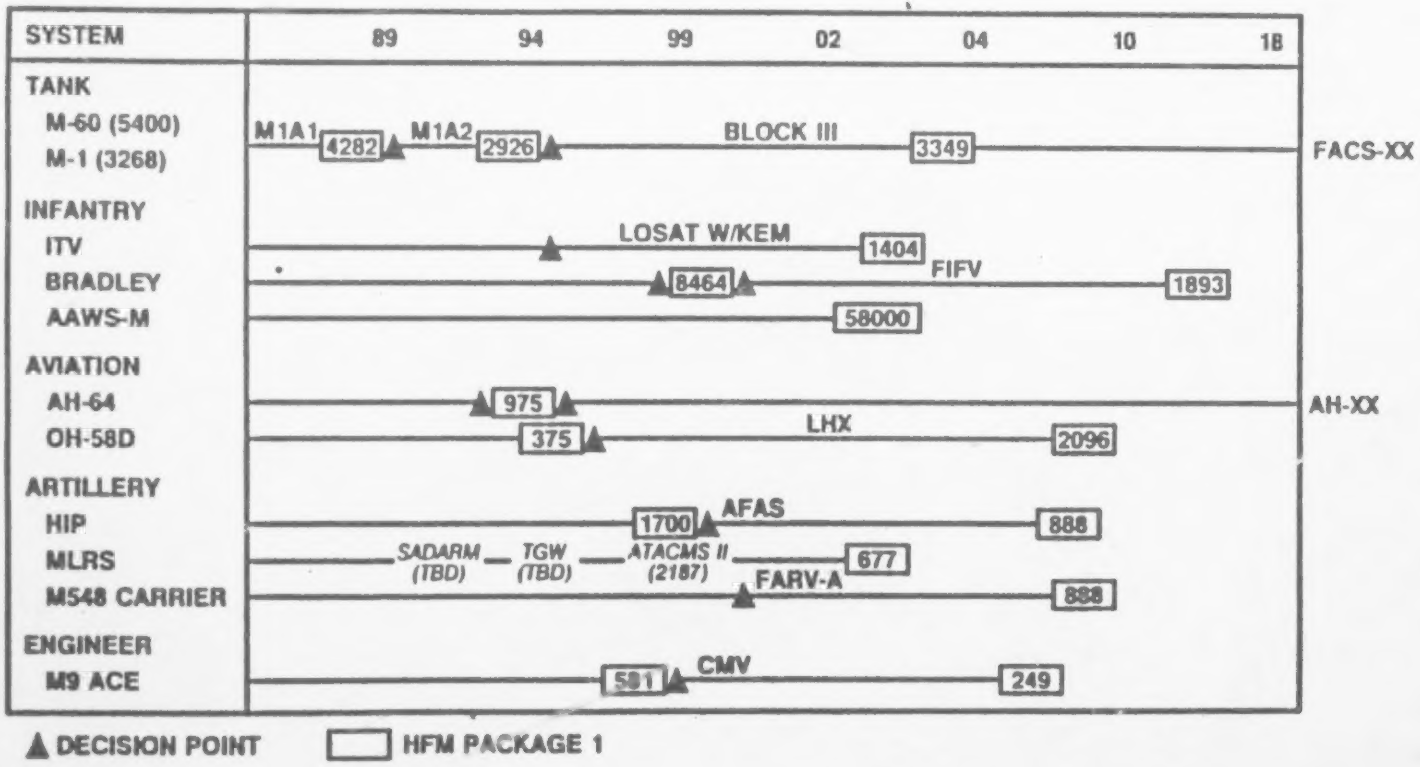
One of the enduring strengths the United States enjoys over potential adversaries is the existence of a broad, high quality, innovative private industrial sector. Were we to rely only on government R&D centers, capable as they are, we would deny ourselves this tremendous advantage. Therefore, industry will be involved as a partner with government through open competition at each stage of the Heavy Force Modernization program. While we will not ignore approaches based on conventional wisdom, innovative solutions will be encouraged for the next generation of vehicles. Contracts will be performance oriented in order to challenge industry to provide the best, most cost effective solutions to Army requirements. It is through the competitive process that we hope to achieve innovative answers to Army requirements which might otherwise not come about.

And finally, we will be proactive. Were we to adopt the philosophy of waiting for the optimum solution, we would make no progress at all, indeed we would fall further behind. The Soviets pursue a steady, redundant, evolutionary modernization program which improves fielded systems and produces new systems on a regular basis. In order to keep up with the threat, much less to turn inside it, we must have a dynamic modernization program of our own that continuously improves our war-fighting capabilities.

We can accomplish this goal with the Armor AntiArmor, Aviation, Heavy Force, Fire Support and Tech Base modernization plans. With your help and support, we will provide our Army with what is needed for it to continue to serve as a viable deterrent and to be ready should it be called upon to protect our Nation's vital interests.

Gentlemen, we are ready for your questions.

ARMOR / ANTI-ARMOR



The **Chairman**. Thank you very much.

Mr. Leath.

Mr. **Leath**. Thank you, Mr. Chairman.

I think you can agree we can certainly call this a blue ribbon panel.

General Starry, good to see you again. Dr. Richardson, General Pihl.

Mr. Chairman, I have three questions here that dovetail some of the questions that Mr. Ray asked to have included in the record. He had to go to a readiness hearing.

The **Chairman**. Without objection, we will submit Richard Ray's questions for the record.

[Questions may be found at the end of the hearing.]

Mr. **Leath**. General Pihl, I read your testimony yesterday along with Dr. Richardson's and General Starry's. As far as I am concerned, you are making good progress overall. I believe you are moving in the right direction. Of course, I think the groundwork General Starry and his group has done has placed us on the right path. However, I think the Congress is still extremely concerned about the adequacy of the Army's armor/anti-armor capability in the interim.

I believe this question was probably raised with you in the Research and Development hearing the other day. The information provided to the Congress on the DRAGON missile system, including the Army's armor/anti-armor munitions ready plan, raises serious questions as to the ability to defend itself against an armored threat with principal supportable anti-tank weapons.

In the Army report the hit probability and the kill probability for DRAGON is so low, the system appears to be of no tactical value on the battlefield and the soldiers using it don't survive.

For this reason, the Congress has supported the early development and deployment of the Advanced Anti-Tank Weapon System–Medium (AAWS–M) system. This system will not be available for several years. We cannot permit those units of our forces likely to see action, prior to the fielding of the AAWS–M.

I think we need to emphasize the fact that we won't totally support that program, as far as this Member is concerned, to be equipped with an inadequate armor/anti-armor system.

So for this reason, in the fiscal year 1989 appropriation, the law directed the Army to select the most effective system from four different weapon systems; DRAGON 2 and 3. The law did not ask the Army to procure the cheapest system nor the most convenient to acquire, nor did it specify that selection of an interim system should be consistent with the Army's existing plan.

The act specified that the Army should procure, quote, "the most effective system from the list of systems identified in the law". Again, I emphasize not as a replacement or hinder in any way to the development and production of the AAWS–M, but strictly as an interim to certain strategic positions in the meantime.

My question is, how does the Army intend to comply with the law?

General **Pihl**. We will, first of all, comply with the law and make a selection by 1 June, 1989, as it specifies. We have run extensive tests directed by congressional direction.

The situation facing the Army is we have 10,000 DRAGON launches and 34,000 DRAGON missile systems in the military. They are inadequate. They are the tertiary anti-tank system for heavy forces. A mechanized force, with the Bradley Fighting Vehicle, which has the TOW 25-millimeter Bushmaster and DRAGON in the back. When the infantry dismounts to go into woods or cities and towns they employ the DRAGON.

In the heavy forces, the need to have an interim weapon is not as acute as it is for light forces and our expeditionary forces. In that case, the DRAGON is their principal armor/anti-armor system and needs to be fixed. It is because of that need that we have improved the warhead called DRAGON Generation II to give the soldier the best capability in terms of lethality on the target. We will convert our 15,000 missiles into DRAGON Generation II warheads to give the soldier on the battlefield the best chance to defeat the target.

We appreciate your support, rushing to get the AAWS–M system into the field. We have made a selection of the Texas Instruments candidate. It is a true fire-and-forget weapons system. It has a top attack capability and has the lethality that will defeat any modern tank on the battlefield.

The question then comes down to BILL and MILAN. It is not for me to talk about the in-service use of the Swedish or French Army of those systems. But for the U.S. Army, as an interim system, they are too heavy. They take four men to put them into combat. Their probability of hit and kill is marginal as compared to DRAGON Generation II.

We will send that report forward in time to comply with the congressional direction, but in plain words, sir, we really don't need that interim system.

Mr. LEATH. General, that bothers me a little bit. My understanding is the probability of hit for a DRAGON is about less than 20 percent and the only improvement we have in the DRAGON II is a new warhead, which is not going to increase the probability of hit a great deal.

I think at this point you will find, that the committee, particularly those of us vitally interested in the armor/anti-armor program, might disagree with you. I really don't understand how you are going to justify that as an interim system purely and simply on the grounds that you don't want to try anything else. I think it is ludicrous to think, that in the time it is going to take you to get AAWS–M developed and get it in the field, we will have strategic divisions that may have to go into combat, not having something that is the best they can have.

We are not talking about a lot of money in the scheme of things here. I would certainly encourage you, not only to abide by the letter of the law, but the spirit of the law. I don't think that we are going to be satisfied with something that may have a new gadget on it if it is not going to protect soldiers.

I think we are going to get into an argument as we go along about these one-man, two-man, three-man, four-man crews. I think we are stretching the point a little to say even when we get a new system that one man is going to be able to carry it and all the missiles.

I think we will end up with one, two or three people doing that anyway. The key is survivability at this point. We are talking about, from my point of view, a couple of divisions that we need to make sure have this capability. I would like to encourage you to open your mind up a little bit more about this thing. Don't close it and don't say it wasn't invented here and the hell with it and we are not going to try them.

I have seen extensive briefings and tests on all three systems, including two foreign systems. The two foreign systems I know meet criterion that we are talking about in the 2,000-meter range and top hill. For us to out-of-hand reject that is not wise, in my judgment.

So I would hope that you would give us your assurance that you will not let somebody down the line close the door to the reality of what we are asking you to do.

General PIHL. Sir, I understand the point very well. I do have an open mind. I have looked at all the results, as well. The affordability question is that we are going to spend $25 million to fix our DRAGON warheads. To arm the XVIII Airborne Corps with that missile, our judgment shows us $180 to $200 million.

The question is what risks do you want to take during the period of time you are waiting for the AAWS–M? We have looked carefully at that risk. My concern remains that as we spend potentially $200 million on an interim system, that would be energy and defense resources drained from our critical need for the AAWS–M system.

Mr. LEATH. I think we can assure you that isn't going to happen, gentlemen. I have made it very clear several times that this should in no way affect the development of AAWS–M. I don't think it will. I don't think you have to worry about that as far as the committee's priorities are concerned.

General PIHL. I do not worry about this committee's priorities. I take the case to other forums to include the Defense Department, the low-high mix and good enough versus the best to continue to play in this equation, and that is part of the problem.

Mr. LEATH. Thank you.

I have some other questions, Mr. Chairman, I would like to submit for the record at this point.

[Questions may be found at the end of the hearing.]

The CHAIRMAN. Mr. Davis.

Mr. DAVIS. Thank you, Mr. Chairman.

To follow up a little bit on the previous questions, what is the estimated interim period before we get the AAWS–M system on?

General PIHL. Between now and the mid 1990's.

Mr. DAVIS. What you are saying, I guess, is that you are not going to have an interim system? You are going to go with the DRAGON, continue with the DRAGON II during that period of time. The other two systems, even though they are much more effective at penetrating modern Soviet tank with reactive armor, you are satisfied that we don't need anything but the DRAGON II until the mid 1990's. Is that correct?

General PIHL. Sir, I am not satisfied with the situation, certainly not. I look at the risk that we are taking in that arena. We looked at the threat of hitting the T80 or T72 tanks, with reactive armor, in the heavy force battle. We are working on using the TOW program, TOW 2A and TOW 2B because our heavy missile system is adequate for that threat.

The question is in the third weapons system on the Bradley Fighting Vehicle, when it is dismounted in the closer range, in the 1,000-meter range of the DRAGON, whether or not you want to supplement that with an interim system in between.

In other words, would you need a BILL or MILAN in the back of the carrier that already has a TOW and a Bushmaster on top of it. It is not a satisfactory situation to stay with DRAGON during that period of time.

We think we are doing the best we can by improving the warhead. The question would be taking the monies while waiting for the AAWS-M. We don't see that to be a prudent course of action.

Mr. DAVIS. What is the difference between what you would spend on one of the other two systems again and what you are going to spend on the DRAGON?

General PIHL. Right now we would spend $25 million to product improve the warhead on the DRAGON. To outfit the XVIII Airborne Corps—and I left out DRAGON Generation 3 in my comments because the Marine Corps canceled that system.

By 1 June, we will not be reporting on DRAGON III. It is roughly between $180 and $200 million based on our cost estimates, somewhere in that range, yes, sir, to put either the BILL or the MILAN as an interim system into the XVIII Airborne Corps.

Mr. DAVIS. What will that buy us?

General PIHL. It will change the warhead so that we will have a greater lethality at the target.

Mr. DAVIS. It still will not be capable of penetrating or defeating a modern Soviet tank with reactive arms; is that correct?

General PIHL. That is correct. It stops short of the T72 and T80 tanks with reactive armor. It will handle threats without reactive armor and kill the BMP.

Mr. DAVIS. In your judgment, obviously you think spending $25 million on improving the DRAGON is worth it.

General PIHL. Yes, sir, I do.

Mr. DAVIS. Thank you, Mr. Chairman.

The CHAIRMAN. Chairwoman Lloyd.

Mrs. LLOYD. Thank you.

I would like to direct my comments to the role of the national laboratories. In your testimony this morning, you mentioned the subject of utilizing the laboratories' many systems.

General Starry, looking back to your study of 5 years ago and its recommendation that greater use be made of the DOE labs in armor/anti-armor programs, are you satisfied with the subsequent actions based upon your recommendation? What precisely did you envision? What else, in your opinion, can be done to exploit the scientific talent and resources of the Department of Energy (DOE) labs?

Are you happy with the role that you played in the national laboratories?

General STARRY. Yes, very much so. What was missing was competition. We now have competition.

Mrs. LLOYD. What can we do to exploit the scientific talent and the resources that we have at the DOE labs? It seems to me when we are talking about technology transfer and classified materials and private sector for inventions for technological and scientific advantages, we have a deficiency.

It seems from your testimony we are having a hard time getting the classified and national security information and technologies out of the national laboratories.

Is this true? The time lapse is critical.

General STARRY. In some cases it is a reluctance on the part of the DOD laboratory system to share their very latest information even with other Government laboratories, and certainly with industry.

For example, in the armor equation, there has been a traditional reluctance on the part of the Ballistics Research Laboratory to share the physics of the special armor package on the M1 with industry, even with the national laboratories.

So far—I am speaking to this problem now from the standpoint of somebody in industry trying to help my friends in industry compete in this world. They are in an enormously disadvantaged, and continue in that disadvantaged situation throughout the competition because the data relevant to what is in the most advanced armors has not been made available to them.

I understand about compartments and security. If we are going to have competition, we don't have to publish it in The Washington Post, although that may come about by various means.

But we have to share that information so that the people who are trying to develop the armors or the penetrators, it makes no difference, to know what the problem is in full and know what they are up against.

If a company is developing bullets, it must know what it has to shoot those bullets against and what it must compete with in order to succeed.

There has been great reluctance on the part of industry to compete in these arenas because of the close hold nature of this information and because of the size of the market. The company working on armor, for example, knows that his work is going to be judged by the research lab who defined the armor problem for him in the first place, doesn't see a great market for his product.

So if you are talking about a company spending research and development money on that sort of development, as a manager looking at that, I have to have some reluctance because it is a disadvantage situation from the beginning.

I think the only way to break this up, that is why I suggested it as I did in my testimony, is to ensure that by some management means, we make the Government labs compete with industry and with the Department of Energy labs if they can. If the Government labs can compete, so much the better. If they can't, we ought to get somebody else to do the work.

Mrs. LLOYD. Would you suggest the role of Congress in speeding up the transfer of technologies in system and databases from the labs?

General STARRY. I think my recommendation in that regard would be that the ongoing memorandum of understanding between the Army and DARPA, which is managing this program for them, should include provisions with regard to sharing that information.

Mrs. LLOYD. General Pihl, can you tell me how the Army might make use of the DOE labs with regards to armor/anti-armor research and development after this joint program has concluded and all such work is solely in the hands of the Army?

General PIHL. We intend to take those products and services from DARPA to start with the Red Design Bureau and make sure we keep the Red Design Bureau independent from the Ballistics Research Lab.

I will insist that that happens. We will take each program on merit, as General Starry suggested, to back the winners and reinforce them and integrate those products and services into our technology base.

I am very excited about this because in working closely with Dr. Richardson, we have a great opportunity here. I think those products, the armor and anti-armor technologies are going to give us a leap in the technology capability.

Mrs. LLOYD. Dr. Richardson, you referred to the transition, the link to industry and the DOD laboratories as being very critical.

How are you really utilizing them in materials, and databases, the national laboratories?

Mr. RICHARDSON. We have used them in all three categories. I think the basic thing that is needed is some mechanism to bring their ideas into the game and to fund them just as well as the inhouse ideas are funded.

That is the first point where competition really makes a difference.

I think the upshot of this joint program is that we have brought more industries to play. But they still need some kind of an ombudsman to represent them to make sure that they get in, and that they are happy with the objectivity of the final testing.

The principal thing that Los Alamos has donated to this effort is a tremendous range, a tremendous capability of testing, and objectivity in their evaluations as perceived by industry.

They cannot, by their arrangements with the Government, compete with industry.

Mrs. LLOYD. Thank you very much.

Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Rowland.

Mr. ROWLAND. Thank you very much, Mr. Chairman.

Let me apologize. I had an appointment in the Intelligence Committee. I apologize, I hope to spend more time in the sub-committee. I know you understand.

Gentlemen, if I may, I would like to pose a couple of questions perhaps to go a little deeper into some of the remarks you made to my colleagues.

One of the criticisms by the Defense Science Board was one organization, the Ballistics Research Lab, was assessing the threat, assessing our abilities to feed the threat and writing a report card on these activities.

Do you think that is a valid criticism? If you believe it is, what action do you think we should be taking or what actions have we taken?

General Pihl. Up until the Defense Science Board of 1985, that was a valid criticism. We had blue's interpretation of red. Therefore, we would design both targets and bullets against what we thought the U.S. version of a Soviet target looked like.

From 1985 on, however, and the creation of the Red Design Bureau, we have an independent red assessment capability embedded in that design bureau. Indeed they have delivered, as Dr. Richardson says, using what could be done by the Soviets, some very tough targets indeed.

So now we have the Ballistics Research Lab and the Red Design Bureau, I think, and intellectual competition that is good for our country. I would keep those two separate from one another and not allow that situation where blue is totally evaluating itself again.

Mr. Rowland. Last year Congress directed the Army to select an internal weapons system. That decision was supposed to be done, I believe, by June of 1989.

Would you comment on where we are in that process and what the results are at this point?

General Pihl. Yes, sir. We have evaluated the MILAN 2 and BOFORS BILL in exhaustive testing to look at their capability to provide a supplemental interim system. We also have moved out on a program to upgrade the warhead on the DRAGON missile system and take 15,000 of the DRAGON missiles and improve the warhead in terms of its effect on the target.

The rest of the capability is the same DRAGON that has essentially been with us since 1972. The Marine Corps evaluated a DRAGON Generation III program, new tractor day/night sight, increased rocket motor and increased range, extending the range out to 1500 meters.

Maj. Gen. Ray Franklin, my counterpart in the Marine Corps, canceled the program because they were in a position of cost overrun and delayed schedule. So they stopped that program and backed the AAWS-M program which has been a joint Army/Marine Corps program from the beginning.

The Army selected a Texas Instruments candidate in the AAWS-M competition where we had three differing technologies; 2,000-meter range, top attack weapon system, 45-pound weight for heavy forces and for light forces.

This weapons system will truly revolutionize the medium fight as far as anti-tank missiles against tanks.

The question facing the Army now is would we, in our constrained budgets that are facing us over the next 8 years, spend $200 million on either the BILL or the MILAN to equip the XVIII Airborne Corps or stick with the $25 million investment we have made in upgrading the warhead on DRAGON II?

We have made those evaluations. The report is being written now. We will send it to you through the Defense Department in time to be here on the 1st of June. At the present time, we have concluded we will skip the step of buying into the BILL or the MILAN if that decision is supported and stay with DRAGON II until we field the AAWS-M.

Mr. Rowland. Was DRAGON II subjected to the same test criteria as the MILAN?

General PIHL. No. We did not have inventory missiles to shoot. DRAGON 2 was just being built. When we agreed to the 1 June date, it was our understanding that was to continue the MILAN and BILL testing and then to take the aggregate of all previous tests and evaluation and try to put them on a level playing field and turn in a report that assessed the merits of each.

But it is not physically possible for you to shoot the DRAGON II the same way we did the BILL and the MILAN because none were built yet.

Mr. ROWLAND. Would you then compare the three systems and their ability to kill a reactive armor enhanced with T72 and T80?

General PIHL. All three fall short of killing a T72 and T80 with reactive armor. BILL and MILAN are better than DRAGON II.

Mr. ROWLAND. I have a couple of other questions I would submit for the record. I would like to thank you all for being here today.

[Questions may be found at the end of the hearing.]

The CHAIRMAN. Thank you.

Larry Hopkins.

Mr. HOPKINS. Thank you, Mr. Chairman.

Gentlemen, let me explore with you just for a second, if I may, a very narrow perspective as it relates only to burden-sharing in this particular area.

Your statement mentioned a Memorandum of Understanding between the Marine Corps and DARPA, I believe, for a 5-year joint technology program. I know that there is a NATO armaments group that discusses the threat and potential countermeasures.

Are we participating or maybe planning to participate in any international joint development project?

General PIHL. Yes, sir, we are.

Within the armament group—in fact, with me is Maj. Gen. Dick Beltson, the United States representative to that group. We have both ongoing activity in heavy anti-tank missile systems and medium anti-tank missile systems.

Mr. HOPKINS. It just seems to me if we involve our allies in the production and are providing an incentive for increased allied spending, therefore it gets into the burdensharing portion of this.

I would urge you to explore that. I think the committee would be interested in any progress you make in that area.

General PIHL. Yes, sir.

INTERNATIONAL COOPERATIVE RESEARCH & DEVELOPMENT ACTIVITIES

Major General Beltson represents the Army in a variety of international fora which have the purpose of identifying international Cooperative R&D programs. The NATO Army Armaments Group (NAAG) and the Four Power Senior National Representative, Army (SNR(A)) are the two principal groups. Additionally, the Army pursues numerous projects with NATO partners on a bi-lateral or tri-lateral basis.

Some examples of specific programs include the eight nation Autonomous Precision Guided Munition (APGM) program under the auspices of the NAAG, the four nation Advanced Tank Cannon (ATAC) program being pursued by the SNR(A), separate armor technology programs with the United Kingdom and Germany and a number of other armor/antiarmor programs with the United Kingdom, France and Germany. In addition, the NAAG and SNR(A) pursue extensive information exchanges to identify appropriate programs for cooperation in the armor/anti-armor arena as well as other areas of military interest.

Mr. HOPKINS. Thank you, General Pihl.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Guidry.

Mr. GUIDRY. Dr. Richardson, we discussed the design. Would you identify the characteristics you think the Army should incorporate if it transitions in the Army?

Mr. RICHARDSON. Yes.

Let me first of all identify a characteristic that isn't Red Design Bureau, intelligence gathering. That is sometimes confusing among people who don't understand the Red Design Bureau's makeup.

We don't do any intelligence gathering. We use intelligence that is already out there. What we do is to involve engineers and scientists who understand this set of technologies that are involved with armor and anti-armor and understand what the Soviets do with those technologies. That means that we understand where the Soviets are in technology as well as anybody and what their design trends are, et cetera.

Armed with that information, they independently begin the design of armor and munitions, but they do so with full cognizance of the weapons systems that those components have to go into.

So they don't design, for example, an armor package that is simply a physics target. They design something that can be integrated into a Soviet tank. That requires, in a word, insulation from our process. It requires some insensitivity, if you will, toward trends that are taking place in the United States, so that when they see a photograph of a Soviet tank or read an article about Soviet technology, they interpret that effort in a Soviet fashion rather than looking at it from a United States standpoint. It is principally important to keep those people insulated by making certain that they don't fall under the influence of some of our own designers who would like to push their designs over into the red. So I think they need to be independent.

Mr. GUIDRY. But beyond that, how would DARPA's philosophy for ideas, how would those philosophies be incorporated? What characteristics would you transfer to the Army?

Mr. RICHARDSON. From the blue team standpoint?

General PIHL. Yes, sir.

Mr. RICHARDSON. Well, of course, everyone from time to time hears industry's ideas and incorporates them.

The Army has for years funded contracts, unsolicited proposals and solicited as well, of industry ideas.

I think what is needed is a proven attention to those ideas, a special effort to get the ideas in and incorporate them in a system that is objective and fair.

Now, there are a lot of ways to do that and we have talked about some of those ways.

I think that can be worked out without any problem.

Mr. GUIDRY. General Pihl, you mentioned that the Army intends to incorporate the Red Design separate and distinct.

What are the elements of this program which you incorporate and do you specifically intend to continue labs in your own areas?

General PIHL. Your last question first.

We do intend to work with the DOE labs. Dr. Sculley, my supervisor, and the Department of Energy, had an ongoing memorandum of understanding before we had the MOU between DARPA and the Marine Corps and the Army.

We were interested in getting the nuclear analysis and their supercomputing power into our conventional program.

So in Los Alamos and Livermore, we have been working with them on technology since the early eighties and shifted that program into the DARPA, Marine Corps, Army MOU.

With regard to the precious nature of the Red Design Bureau, I am not sure at which point in the Army activity we will place that, but I assure you it will be done with very careful consideration to keep it independent.

Mr. GUIDRY. What else is useful?

General PIHL. Of those products that are being evaluated right now from DARPA, I think the most interesting to us and the most profitable are the potential TOW warhead enhancement, red targets, and, the contractor educational process on armor as both General Starry and Jim Richardson have mentioned. Their X-ray technology, electromagnetic and electrothermal; the hydrocode and shared data base, vehicle self-protection and active armor, the ability to stop a missile in flight by projecting out from a tank or a Bradley.

Most importantly, their FERMEX agent X-ray machine will now let us take a look into the composition of armors using their special techniques; and finally, the Red Design Bureau.

So we have great products coming out of the armor MOU now.

Mr. GUIDRY. The Army has traditionally felt that the industry had little to overcome. Has that changed?

General PIHL. Yes, it has changed.

Right now, the principal armor protection for our tank, heavy armor that we are deploying right now, is a very sensitive and highly protected compartmented process.

However, we don't have the only design for that in the world. We are very interested in continuing to cooperate with the MOUs we have with the United Kingdom and the Federal Republic of Germany and their industrial solutions to armored protection.

One of the most exciting is chemical energy protection that the Germans have achieved.

So while agreeing we must protect, from a Western sense, the sensitivity of all of these technologies, there is, I think, a clear need to open up the game to competition-in-armor design.

Mr. GUIDRY. It seems dating from the 1985 report and from your own, the Army's own appointment of an anti-armor task force that the Army has found its own structures inadequate by implication to deal with this continuing problem.

If the task force goes away and the DARPA program goes away, would you expect to find yourselves in the same fix in the future?

General PIHL. I certainly hope not.

The cooperative nature of this process and the cooperative approach to it has been good.

Dr. Richardson's funding within DARPA has tripled as a result of the Defense Science Board. That kind of effort, DOE, DOD and the Army, has to continue because I would believe that DARPA should stay on the advanced and cutting edge of high technology, but as far as the Army is concerned, no question about it, we drug our feet for a year after the Defense Science Board. We have now got our act together.

We now have the Chief of Staff of the Army, who is vitally interested in this area, stay with it on a weekly management basis. Every Wednesday we review it in his office.

My job certainly is focused on this particular problem. I spend one third of the budget I am responsible for on this problem and so when Colonel White's task force has come and gone, my office will still be in charge of this enterprise and so will the Chief of Staff.

Mr. GUIDRY. Does your office has sufficient focus to maintain momentum?

General PIHL. That is the problem.

We focus on the breadth of R&D so I have to be sure that I am resourced within 209 personnel, to keep an activity dedicated to this. So some part of Colonel White's office has to transfer into my office.

Mr. GUIDRY. Thank you.

Thank you, Mr. Chairman.

Ms. SLATKIN. Just one follow up on a question.

Do you expect the task force to lay out a series of structural changes or changes to accommodate the Red Design Bureau in the next couple of months?

General PIHL. The task force report is in draft at the present time. It will be completed in the next month. We will be able to transmit it well before the budget revision comes over. Structural changes are a part of our recommendations in terms of both management and activity.

Colonel White, I think, will have that ready in about a month.

Ms. SLATKIN. So we will be able to see all the specifics you have laid out; the transition from DARPA and the intelligence aspects?

General PIHL. Ten chapters in the volume will cover those details.

Ms. SLATKIN. One final question for you, General Starry: Do you see a need now for another panel to review implementation of your previous work?

General STARRY. I can't speak for the DSB, obviously. We thought a year ago that we might do just what you suggested. It was discussed in the management of the Defense Science Board, and set aside because we had ongoing any number of programs which have not yet come to fruition.

It seems that we would be better advised to wait a year or two and see how things turn out.

We really hadn't given the program time to produce anything yet. So it would have been premature. But like all ad hoc management arrangements, I must say that two things happen. One is the existing institution resents them as being dysfunctional and they are a function of the dedication and the devotion of the people involved in their successful execution.

So one must—in any ad hoc management system, we must be sensitive to that. People change out and as the existing bureaucracy gathers steam, these things tend to go away and we fall back into our previous ways very easily.

The **Chairman**. Thank you all.

Gentlemen, thank you very much.

The subcommittee is adjourned.

[Whereupon, at 11:55 a.m., the subcommittee adjourned.]

[The following questions were submitted to be answered for the record:]

AAWS-M

Mr. Ray. In the FY 89 Defense Authorization Act, the Congress directed that the Army undertake an analysis of four anti-tank weapon systems to determine which would be the most effective on an interim basis prior to the development of AAWS-M. In addition, Congress asked that the Office of Operational Test and Evaluation to conduct an independent assessment of that analysis. Can you tell us what the status is of both the Army report and the independent assessment? Does the Army's decision and the independent assessment conflict and, if so, please tell us why?

General Pihl. The Army has conducted its test of the supplemental interim candidates for possible contingency force application in accordance with the test plan the Army submitted to Congress in 1987. As directed by Congress, the Operational Test and Evaluation Agency (OTEA) has conducted an independent evaluation of these tests. Additionally, the Army conducted an abbreviated Cost and Operational Effectiveness Analysis of the candidate systems. The conclusions of all three evaluations are essentially the same:

(1)

(DELETED)

(2) Neither MILAN nor BILL are suitable for employment by contingency forces due to their inability to be employed by an individual parachutist.

(3) Similarly, MILAN and BILL are unsuited to light infantry employment because their configuration and weight require 3-4 man crews. Their employment would necessitate restructuring those units in order to carry the load and would reduce, by 25 to 50 percent, the number of medium antitank systems available to these units (depending on crew size).

(4) In terms of cost and operational effectiveness, DRAGON GEN II, though not ideal, is the best of the avalilabe system to fill the void while AAWS-M is under development.

Mr. Ray. The four systems designated by the Congress were DRAGON II, an improved warhead version of the existing DRAGON; DRAGON III, a developmental program of the Marine Corps; and two foreign systems, Bofors BILL and MILAN II. Can you give us a report on the development of DRAGON II and DRAGON III as well as your assessment of the testing on Bofors BiILL and MILAN II?

General Pihl. As you are aware, DRAGON GEN II is not a new missile; it is a product improvement of the warhead. The DRAGON GEN II retrofit is currently under way. The US Marine Corps has taken delivery of approximately 800 of the retrofit missiles. Army deliveries are scheduled to begin in 4QFY89. The Army will retrofit 15,000 DRAGONs to DRAGON GEN II at a cost of $23 million. Technical testing confirmed the warhead upgrade will have no operationally measurable impact on the soldier's use of the DRAGON system other than increased penetration of the target. As for testing the interim medium antitank candidates, both MILAN and BILL were subjected to a full range of technical and operational tests in accordance with the plan which the Army submitted to Congress in 1987. GEN III DRAGON was not tested because the program was in development and no hardware was available; the program has since been terminated. DRAGON GEN II was not tested either. This is because there were no production GEN II rounds available for a technical test when the MILAN/BILL tests were run, nor were there any inert GEN II warheads to conduct an operational test. Earlier USMC tests of the round indicated that the GEN II warhead increased the armor penetration of the warhead by 85 percent without significantly affecting the missiles flight characteristics or probability of hit. DRAGON II comparisons against MILAN/BILL were made utilizing data available from the eight previous operational tests of DRAGON. The preliminary Army decision that GEN II should be the interim system is based on its evaluation that (1) neither BILL nor MILAN offer significant operational advantages over DRAGON II, although there obviously are individual areas, such as range, where MILAN and BILL do offer improved capabilities; (2) both MILAN and BILL have demonstrated shortcomings which offset whatever advantages they offer in terms of operational suitability, and (3) the cost vs. expected utility of either MILAN or BILL do not make them cost effective solutions.

DRAGON

Mr. Leath. The Department of Defense Office of Operational Test and Evaluation recently has conducted an independent assessment of the Army's decision to continue procurement of the DRAGON II. It is our understanding the DOTE report does not conclude that the DRAGON II is the most effective of the interim system candidates. How does the Army's selection of the Dragon II reflect compliance with the law? Was Dragon II operationally tested in a comparative manner with the Bofors Bill and Milan II?

General Pihl. The Army has reviewed the DOT&E report. The preliminary Army decision that DRAGON GEN II should be the interim system is based on its evaluation that (1) neither BILL nor MILAN offer significant operational advantages over DRAGON II, although there obviously are individual areas, such as range, where MILAN and BILL do offer improved capabilities; (2) both MILAN and BILL have demonstrated shortcomings which offset whatever advantages they offer in terms of operational suitability, and (3) the cost vs. expected utility of either MILAN or BILL do not make them cost effective solutions.

To the best of its ability, the Army has addressed in the operational testing and evaluation the considerations listed by Congress. Both MILAN and BILL were subjected to a full range of technical and operational tests IAW the plan which DA submitted to Congress in 1987. GEN III DRAGON was not tested because the program was in development and no hardware was available (the program has since been terminated). Since DRAGON GEN II was only a warhead retrofit it was not tested either. Additionally, there were no retrofit GEN II rounds available for a technical test when the MILAN/BILL tests were run, nor were there any inert GEN II warheads to conduct an operational test. Earlier USMC tests of the round indicate that the GEN II warhead increased the armor penetration of the warhead by 85 percent. Actual firings of Dragon II are not necessary; technical testing confirmed that the warhead upgrade will have no operationally measurable impact on the soldier's use of the DRAGON system other than increased penetration of the target. DRAGON II comparisons against MILAN/BILL were made utilizing data available from the eight previous operational tests of DRAGON.

Mr. Leath. In March 1988, the U.S. Army submitted an Anti-Armor Munitions Master Plan which included estimates of the Probability of a Hit for the Dragon. In the Army's response to the provisions of the FY89 law, was the same probability figure used?

General Pihl. The March 1988 data were not used. The Army conducts an annual update of threat description. The Fall 1988 update resulted in minor changes to probability of kill for all of the systems. The adjusted estimates were used in the Army response.

Mr. Leath. As you might expect, gunner survivability is of critical importance to the Congress in the selection of an interim system. This, in turn, is affected by the range of the missile, the speed with which the missile travels to the target, and the smoke and candidate systems in order of their maximum range, time-to-target and their smoke flash signature.

General Pihl. Both BILL and MILAN II have equivalent range and missile speed which are twice the range and speed of DRAGON II. Launch signature is approximately equal for all systems.

Mr. Leath. We note the Army is requesting 2,000 m range and top-attack capability as part of the parameters for this development of the optimum AAWS-M. There must be a good reasons for this. We note that both Milan and BILL have 2,000 m range. Are either of these two systems top-attack?

General Pihl. MILAN is not a top attack weapon. BILL does attack from the top in its primary employment mode. However, based on the technical warhead and flight tests, BILL does not provide significantly increased lethality over DRAGON or MILAN for two reasons: BILL has a relatively small unitary warhead which is canted to shoot down at a 30 degree angle into the top of a target.

(DELETED)

For that reason, although they do not attack from the top, the larger MILAN and DRAGON II warheads generally outperform the BILL warhead.

Mr. Leath. If DRAGON was not rated the most effective system by DOTE, has the lowest probability of kill, and results in the lowest probability of crew survival (due to its short range, low velocity and large smoke/flash signature), how does the Army's selection of Dragon comply with the statutory requirements to select the "most effective system"?

General Pihl. The Army evaluation of the operational test issues addresses the specific concerns raised in the laws. The language also specified that the SEC Army make his determination based on other factors, including portability by field troops, countermeasures vulnerability, system reliability and safety. A Cost and Operational Effectiveness Analysis was also required. When all of these factors are considered, the overall evaluation supports the selection of DRAGON GEN II and does, in fact, result in the selection of the "most effective system".

MILAN 2T

Mr. Rowland. The improved MILAN 2T with tandem warhead (DELETED) (DELETED). The French and Germans have selected this system for fielding in 1990. Why doesn't the Army select an interim system with a tandem warhead (DELETED), (DELETED),

General Pihl. Congress directed the Army to conduct an evaluation of MILAN, BILL, DRAGON GEN II, and DRAGON GEN III and further directed that the Secretary of the Army should make a selection of an interim system by 1 June based on all operational tests and evaluations conducted on these systems as of that date.

The MILAN 2T is still in development so it was not available for our evaluation. Based on technical data made available to the Army, we have made a preliminary estimate on the capabilities of the new warhead.

[illegible]

AAWS-M

Mr. Rowland. Shouldn't the Army provide certain early deployable forces with a system that can kill Soviet tanks in the event we are engaged in combat during the development of AAWS-M?

General Pihl. As you are aware, the Report to Accompany the FY87 Authorization Bill directed the Army to evaluate MILAN II as a interim system for "special mission Infantry battalions." Subsequent to that, the evaluation was expanded to include BILL, DRAGON GEN II, and DRAGON GEN III. The Army conducted its test of the supplemental interim candidates for possible contingency force application in accordance with the test plan the Army submitted to Congress in 1987. As directed by Congress, the Operational Test and Evaluation Agency (OTEA) has conducted an independent evaluation of these tests. Additionally, the Army conducted an abbreviated Cost and Operational Effectiveness Analysis of the candidate systems. The conclusions of all three evaluations are essentially the same:

(1)

(DELETED)

(2) Neither MILAN nor BILL are suitable for employment by contingency forces due to their inability to be employed by an individual parachutist.

(3) Similarly, MILAN and BILL are unsuited to light infantry employment because their configuration and weight require 3-4 man crews. Their employment would necessitate restructuring those units in order to carry the load and would reduce, by 50 percent, the number of medium antitank systems available to these units.

(4) The bottom line to all this is that none of the above systems provides the capabilities we would like to have vs. current threat tanks with reactive armor. However, in terms of ability to kill less sophisticated tanks and other targets, DRAGON GEN II is more lethal. In terms of cost and operational effectiveness, DRAGON GEN II is the best system to fill the void while AAWS-M is under development.

The Army's priority for fielding any enhanced medium anti-armor system, whether AAWS-M or an interim system, is first to the contingency forces and then to forward deployed forces. Given the anticipated threat that contingency forces could expect to encounter and the time frame involved, DRAGON GEN II provides an acceptable interim capability.

Soviet Tanks

Mr. Bustamante. Development of new armor by the Soviet Union may pose a serious threat to American Anti-Armor development efforts. How many tanks have the Soviets fielded to date

(DELETED)

General Pihl.

Conservative estimates are that these tanks remain in the active Soviet tank fleet. S/WN

Mr. Bustamante. Didn't the Army's initial projections for Soviet tank developments that lead to the T-80 assume that they would use extensively

General Pihl. Our forecasts were that the Soviets would use

We are confident that our forecasts were correct.

Mr. Bustamante. What makes you assume now that the Soviets have overcome the technical problems with glass?

General Pihl. Glass and glass-reinforced plastic materials are not difficult to integrate into tank armors. Both the USSR and the U.S. have been successful in applying these materials in light and heavy armors for years. Glass can be integrated in block, tile, or composite forms. It is easily shaped to fit through molding or grinding. Glass-reinforced plastic is usually applied in large flat sheets between layers of steel in the upper glacis of Soviet tanks.

FORCE MODERNIZATION

Background. The assertion that the Soviet Union has been outmodernizing us in the application of new technology by about four to one is misleading. It fails to take into account the different approaches between the U.S. and the U.S.S.R. The American approach is based in many cases on developing and fielding an entirely new system. For tanks, this includes a new engine, new tracks, drive train, gun, fire control, etc. For anti-tank missiles (except the TOW missile) this is also the case and has led to serious fielding delays. The Soviet approach is based on changing one part at a time. For a tank, such as the T-72, only the hull and gun were really changed from the previous T-62. All other components were as time-tested as any Detroit car components used over the years in different car models. This saves time on getting new ideas to the field, while also reducing risk in the Soviet closely controlled design bureaus. Note that the T-80 is a further refinement of the T-72. The Soviets use the same method for missile and ammunition development.

Mr. Bustamante. It has been asserted that the Soviet Union has been outmodernizing our military at a rate of about 4 to 1 in the application of new technology to fielded systems. Although this appears alarming, is it not true that the Soviet approach to weapons development is one of step modernization rather than our brand new from the ground up approach? If step modernization reduces risk and saves time on getting new ideas to the field, why aren't we using more of this approach?

General Pihl. Your assertions about the lineage and modernization of Soviet tanks are incorrect. The T-62 shares about as much similarity with the T-72 as does our M60A3 with the Abrams tank. They are radically different in design, commonality of parts, and combat capability. Although the T-72 and T-80 are similar in appearance, they have different autoloaders and ammunition carousels, different technology engines, and only the T-80 fires the AT-8 missile.

The Soviets follow two different and redundant modernization paths. First, their multiple design bureaus generate revolutionary new models every fifteen years or so. Second, and in the interim between fielding of these new models, they product improve their extant tank fleet through depot level retrofit and they cut "running changes" into their tank production lines. The net result is a total modernization program that dwarfs NATO outputs.

The Soviets reduce their risk of revolutionary new tank models by sustaining high production outputs for current, proven models until the new model has been troop tested and de-bugged. Using four or more production facilities, ten or more depot repair facilities, and multiple design bureaus, the Soviets are able to stagger the introduction of new models, improved current models, and retrofitted older models into the fielded force. The result is an expensive but unparalled and unabated rate of tank modernization.

The Army's acquisition philosophy dictates that new developments are to be performed as a last resort, only after other alternatives have been considered and rejected. Those other alternatives include product improving existing systems, buying commercial items next, or then adapting commercial items for military purposes. We use the product improvement (block modernization) process extensively to upgrade existing systems. Examples include the Abrams tank, Bradley Fighting Vehicle System (BFVS), TOW, M16 rifle, AH-1 Attack Helicpoter, and many more. These systems have had numerous product improvements. We fielded the Abrams tank in 1980 and the BFVS in 1981, and we have made one block improvement and have another one in process for each system.

So, you can see that we do, indeed, use the product improvement process extensively. Just as there are instances where it makes sense to product improve, there are instances where it makes more sense to go with a new system. The threat may change to the extent that existing systems lack the growth potential to meet that new threat, existing equipment may no longer be capable of executing evolving doctrine, or technological advances may justify a new system to fully realize the technology potential. We have focused our technology base to support future requirements and we are pursuing key technologies such as a new tank cannon, fire control, advanced propulsion system, external suspension, and electronics architecture, that offer the improvements necesary for either new systems or modifications to existing systems. The Heavy Force Modernization Plan provides flexibility and does not foreclose any of our acquisition options. In the near term, we will continue with modifications of existing systems. Beyond that, our strategy will permit industry to respond to performance oriented requests for proposals with either existing systems, modifications of existing systems, or new systems. We will select the ideas that provide the best, cost-effective warfighting capability. In all cases, we will follow the recommendations of the 1987 Defense Science Board Summer Study on Technology Base Management to reduce risk and accelerate the transition of technologies to fielded systems.

ANTI-ARMOR PROGRAM

Mr. Bustamante. Recent tests conducted on the Bofors BILL, Euromissile MILAN II and the Army DRAGON II (improved) have suggested that the Army need only make minor improvements to the DRAGON for it to serve as our medium anti-armor weapon for the next 5 years. If this is true, why was this not done at least as early as 1981 as a part of the IMAAWS/RATTLER Anti-armor program, and why should we proceed with the AAWS-M program?

General Pihl. The Army never suggested that DRAGON GEN II could fulfill the AAWS-M requirement

[illegible]

The bottom line to all this is that none of the above systems can fulfill the AAWS-M requirements. In the interim, in terms of cost and operational effectiveness, neither MILAN nor BILL have demonstrated significant operational effectiveness or suitability advantages over DRAGON GEN II to warrant their acquisition. DRAGON GEN II is the best system to fill the void while AAWS-M is under development.

Mr. Bustamante. What guarantee does the Army have that the new AAWS-M Medium Anti-armor missile will be a viable weapons system ready to be fielded in five years? With the history of problems with Anti-armor missiles, significant delays could be possible, shouldn't you consider a viable interim system other than the failed DRAGON?

General Pihl. The Army just completed a very successful proof of principle (POP). Three competing technologies were evaluated in POP, and it should be pointed out that all three contractors successfully completed POP and were judged fully qualified to enter Full Scale Development (FSD). The Army had the enviable position of selecting from three winners. This program is on track. It is fully supported in the Army budget and enjoys one of the Army's highest requirement priorities. We are approaching FSD with a success oriented plan. Our acquisition strategy calls for a teaming arrangement in FSD with head-to-head competition in production. We have two highly qualified producers, Texas Instruments, Incorporated and Martin Marietta Corporation--each highly qualified, state of the art defense contractors. Further we have required the contractors to develop two sources for any critical missile components. The Army cannot afford to fail on this one and we will not.

As for your question on an interim medium antitank system, of course we would like to have an interim system that will frontally defeat modern Soviet tanks with advanced armors;

[illegible]

In terms of cost and operational effectiveness, DRAGON GEN II is the best system to fill the void while AAWS-M is under development.

Mr. Bustamante: The Army recently stopped further purchases of the light anti-armor weapon AT-4. What is the replacement for this class of weapon and when did it enter production?

General Pihl: The Army stopped further purchases of the AT-4 due strictly to affordability in FY 91. There is no replacement for this item currently planned for production.

ANTI-ARMOR MISSILE

Mr. Bustamante. Would the witnesses agree with the contention of the foot soldier that "we want to know if a soldier can kill a tank and live to talk about it?" If you agree that the primary concern of the soldier is that the tank is defeated each time he fires the missile, don't you also agree that the weight, and number of personnel required for the system become secondary considerations?

General Pihl. I certainly agree with you that the soldier's confidence in his weapon system on the battlefield is important; but the ability to get the weapon system to the battlefield is equally important. You must keep in mind that any interim medium antitank weapon system would be for our airborne contingency force units. Gunner survivability is impacted by many factors such as system detectability, system exposure, time to move the system to cover from an exposed firing position, and susceptibility to countermeasures. Additionally, the survivability of the force comes into question if a system cannot be employed on the drop zone--the place of highest risk--or arrive at a critical point in battle after an extended approach march due to problems with transportability and portability. These type of employment problems are what make 3 and 4 man systems unacceptable as an interim antitank system for our contingency forces.

The Army just concluded extensive evaluations and testing of the possible supplemental interim candidates for contingency force application in accordance with the test plan the Army submitted to congress in 1987. As directed by Congress, the Operational Test and Evaluation Agency (OTEA) conducted an independent evaluation of these tests. Additionally, the Army conducted an abbreviated Cost and Operational Effectiveness Analysis of the candidate systems. The conclusions of all three evaluations are essentially the same:

(1)

(2) Neither MILAN nor BILL are suitable for employment by contingency forces due to their inability to be employed by an individual parachutist.

(3) Similarly, MILAN and BILL are unsuited to light infantry employment because their configuration and weight requires 3-4 man crews. Their employment would necessitate restructuring those units in order to carry the load and would reduce, by 25 to 50 percent, the number of medium antitank systems available to these units (depending on crew size).

(4) In terms of cost and operational effectiveness, DRAGON GEN II, though not ideal, is the best of the available systems to fill the void while AAWS-M is under development.

Mr. Bustamante. We have heard much about the demise of the chemical energy Anti-armor weapon in the face of reactive armor. Is it not true that chemical energy warheads may defeat such add-on armors with a tandem warhead, making many current NATO Anti-armor systems very viable at minimal procurement cost?

General Pihl. No sir, it is not that simple. Our analysis shows that direct attack weapons such as MILAN II,

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NAVY PROGRAM REVIEW

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Thursday, May 11, 1989.

The subcommittee met, pursuant to call, at 10 a.m., in room 2118, Rayburn House Office Building, Hon. Les Aspin (chairman of the subcommittee) presiding.

STATEMENT OF HON. LES ASPIN, A REPRESENTATIVE FROM WISCONSIN, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

The **Chairman**. The meeting will come to order. Let me announce this is the meeting of the Procurement Subcommittee, and we have the honor of having the witnesses from the Navy here this morning.

We have Everett Pyatt, Admiral Dunn and General Pitman. I want to welcome our witnesses this morning and let them begin with their opening statements, and then we will have some questions.

Secretary Pyatt, the floor is yours.

STATEMENT OF HON. EVERETT PYATT, ASSISTANT SECRETARY OF THE NAVY, SHIPBUILDING AND LOGISTICS, DEPARTMENT OF THE NAVY

Mr. **Pyatt**. Thank you, sir. If I may, I would ask that all of our prepared statements be entered in the record.

The **Chairman**. Yes, without objection, the full text of all the statements will go in the record at this point.

Mr. **Pyatt**. I have some brief opening remarks, and Admiral Dunn has some remarks.

As you know, every time we go through an exercise of getting the programs within the budget totals that we are given, we have to go through a lot of thought and analysis, and in doing it this year, we tried as we have before to maximize our deterrent and war-fighting capabilities and maintain the costs.

Some programs were canceled in order to keep economic procurement quantities up, as well as to maintain the continued readiness of existing forces. I understand there is some debate about the specific programs that have been canceled, and I am sure we will explore these later today.

But we did maintain our highest leveraged programs in the A-12 and the LRAACA or P-7 because these two programs, each in their own category, provides the most leverage for the future.

In doing this, we tried to match inventories of various kinds of systems we were talking about, taking a look at the test results that were coming along so that we matched procurement schedules with test results, and in a couple of programs this had a direct impact, and look at the program cost growth that we were concerned about in the future.

Some of these programs, while easy to fix now, have a long-term tale that has to be fixed over a couple of decades. From this, we concluded that the F-14D new procurement was canceled because inventory levels were adequate to meet the near-term needs, particularly as we plan to upgrade the F-14As and F-14Ds.

This does place a long-term reliance on the NATF and making it happen on schedule and within cost, and there are things that need to be considered there. We have been through an issue on the A-6 last year, even though the study that was given to Congress on the A-6 shows we have a shortage. But we are really banking on the future in the A-12 and improving that segment of the naval aviation force.

The V-22 was canceled. It had several problems—cost, performance—and in looking at the alternatives for the future, there are alternatives for accomplishing the Marine troop and heavy lift requirement, although I think many of us feel the V-22 would do it better.

The A-12, as I said, was fully funded; the LRAACA was fully funded. SH-60F was canceled to allow operational testing fixes to be incorporated before proceeding with full rate production. I think that is prudent management.

The T-45 was also slowed down to allow fixes that identified in the Operational Evaluation (OPEVAL) to be incorporated into the program. So the amended budget submission that you have represents a program that had these considerations put in during its preparation.

That ends my summary remarks; and Admiral Dunn, I think, has a few words he would like to say.

PREPARED STATEMENT OF EVERETT PYATT

I am pleased to appear before this committee today.

Last week the Under Secretary of the Navy appeared before the Seapower Subcommittee and presented a comprehensive overview of the Navy's Amended Budget Submission (ABS) for FY 90/91. Our discussion today will focus on the aviation portion of that budget request. I am accompanied by Vice Admiral Dunn and Lieutenant General Pitman.

The reduced Navy budget before the committee is the result of rigorous and difficult analysis performed to meet fiscal constraints. Our deliberations, as always, were guided by the requirements to maximize our deterrent and warfighting capabilities at the least cost to the taxpayer. As a result some programs were cancelled in order to ensure economic procurement rates in other areas as well as the continued readiness of existing force levels. Some of you may disagree with specific decisions, but when viewed in the aggregate, I believe we forwarded a balanced program. Our high leverage programs such as the A-12 and LRAACA were spared while reductions in other programs allowed us to meet budget constraints. Some development programs that are experiencing cost and technical problems were cancelled.

I would like to take just a minute to give some insight into how we determined the mix of programs contained in the ABS. Each program was examined against the following set of criteria:

- Inventory match to requirements.
- Shortfalls in inventory that are having a significant impact on warfighting capability.
- Testing results of programs in FSD or production.
- Progress of programs in development.
- Program cost growth.

Using these guidelines, we carefully examined each program, from the F-14D and the V-22 to our needs for spare parts and supplies. Difficult choices had to be made since available funding could not support all of our programs. Some critical decisions were made on a number of major programs:

• F-14D new procurement was cancelled because inventory levels are sufficient to meet our near team warfighting needs, particularly as we plan to upgrade 400 F-14As to F-14D configuration.

• No new A-6s are required, but a modest upgrade program was approved to give it additional warfighting capability in the 1990's.

• The V-22 was cancelled for a number of reasons:

- Substantially behind schedule
- Over cost

- Development problems not yet resolved
- Alternative platforms available to accomplish Marine Corps troop/heavy lift requirements.

• A-12 fully funded because this development program is on cost, on-schedule and well managed.

• LRAACA fully funded for the same reasons.

• SH-60F buy cancelled in FY-90 to allow operational testing fixes to be incorporated before proceeding on with full rate production.

• T-45 slowed to allow resolution of major design deficiencies.

The resulting Navy ABS containing these and our remaining programs we believe represent a balanced mix of new and in-production programs that will serve the Navy well now and in the future. In summary, we went after programs that work, save money and were not experiencing delays from testing or development. I think this is the prudent course given the severe budget constraints we face. I look forward to a discussion of these issues and am ready for your questions.

STATEMENT OF VICE ADM. ROBERT F. DUNN, ASSISTANT CHIEF OF NAVAL OPERATIONS, AIR WARFARE, DEPARTMENT OF THE NAVY

Admiral DUNN. Yes, sir. I would like to take this opportunity to point out that behind me is Vice Admiral Wilkinson, the Commander of the Naval Air Systems Command, who is available to answer any technical questions that you may have, and also behind me is Vice Adm. Dick Dunleavy, who will relieve me in 2 weeks as the Assistant Chief of Naval Operations for Air Warfare.

As I come before this committee, I come with a mixture of both pride and concern. I have pride in the way things are going in naval aviation today but concern about tomorrow. The investment that we put into the Navy and specifically naval aviation, with the help of this committee over the last few years, has provided us with a force structure and capability to do very well.

Today, all of our deployable carriers, including Coral Sea and Midway, are meeting their commitments. Even as I speak, nine of the 14 deployable carriers we have today are at sea. Readiness is high in ships, in aircraft and people; and you will recall that last April when called upon, Naval Aviation put Iranian war ships and gun boats out of action and again in January 1989 when attacking Libyan MiGs were downed by F-14s.

Our personnel are the best we have ever seen. Because their compensation has been adequate and they have had reasonable time at home, we are keeping them.

Also, we have just completed the safest year in history. Our accident rate was 2.16 accidents per 100,000 flight hours. We lost 48 aircraft as opposed to 72 aircraft the year before, and so far in calendar year 1989, we are doing even better.

As of this morning, we have lost 16 aircraft—and I hasten to add that is 16 too many—but our rate stands at 1.87, which compares with something like a rate of 55 accidents per 100,000 hours in the year I got my wings.

For the future, I am less optimistic. The first concern is force structure. In order to meet the requirements of our allies and the fleet commanders in chief, and in order to maintain operational tempo which helps our people, we need a minimum of 15 deployable aircraft carriers, but affordability keeps us at 14.

At 14, we will continue to not meet certain commitments, we entertain some risk, and we have got to be careful not to stretch people too much. We have to do this, meet these commitments and be on station ready to go with 14 carriers despite the fact there is a proliferation of sophisticated weapons with longer range and latest technology, not only in the Soviet Union but in many of the Third World countries.

At the same time, there are increasing limits on access to overseas bases and overflight rights and continuing dependence on international trade for economic vitality in the free world. The only military force that can fill this void, meet the increasing worldwide demand for deterrence and warfighting, is a mobile capable force of the carrier battle group which is Naval Aviation at sea.

The second concern I have is in proper mix. I certainly support the President's budget, but I am concerned about having the right mix of airplanes, weapons systems and weapons to meet our long-range requirements at sea. Naval aviation is in a transition period, ready to reap enormous benefits of early research and development investments.

We cautiously terminated several programs, the A-6, the P-3, the F-14A, and the AH-1 in order to transition to new technology, and naval aviation requires an orderly modernization in order to keep proficient.

Mr. Pyatt has already mentioned the A-12, the stealth and medium attack capability as urgent follow-on to the A-6, our number one priority; the F-14D, in order to maintain dominance until a follow-on fighter is developed; the EA-6B, advanced capability electronic warning aircraft and Advanced Tactical Surveillance System, which will see both battle management, surveillance and multi-dimensional warfare missions currently accomplished by the E-2C, S-3A/B, EA-3B/ES-3B, and the EA-6A/B and the land based maritime patrol aircraft already mentioned is the P-7A.

The SH-60 Foxtrot, our carrier inner zone submarine aircraft is extremely important to the continuing capability of Naval Aviation and the Navy. It is needed to replace the aging SH-3. We need over-the-horizon medium lift assault capability, air-to-surface weapons which allow greater standoff capability, and electronic warfare systems to destroy enemy systems and improve our own survivability.

Third, we have to maintain a viable training program with adequate flying hours in order to ensure that we have the highly motivated and trained people necessary to operate the systems the people of the United States have provided. We have to maintain our pilot training rate at satisfactory levels in order to preserve the framework for future growth.

In summary, Naval Aviation is meeting its commitments today; and even though the world is changing, we feel we can continue to meet the commitments, but the budget reductions present special challenges for all of us. We are concerned that we have the right mix of aircraft and weapons and ships for the fleet of the future.

General Pitman has just a few words.

PREPARED STATEMENT OF VICE ADM. ROBERT F. DUNN

WITNESS LIST

BEFORE THE

SUBCOMMITTEE ON PROCUREMENT AND

MILITARY NUCLEAR SYSTEMS

OF THE

HOUSE ARMED SERVICES COMMITTEE

11 MAY 1989

SUBJ: NAVAL AVIATION PROCUREMENT

PRIMARY: Vice Admiral Robert F. Dunn, U. S. Navy
Assistant Chief of Naval Operations
(Air Warfare)

Lieutenant General Charles H. Pitman, U.S. Marine Corps
Deputy Chief of Staff for Aviation
U.S. Marine Corps

Vice Admiral Joseph B. Wilkinson, Jr.
Commander
Naval Air Systems Command

Report by VADM Robert F. Dunn
Assistant Chief of Naval Operations (Air Warfare)
on Naval Aviation Procurement for the Fiscal Years 1990 and 1991 Amended Budget Submission (ABS)

INTRODUCTION

Mr. Chairman and distinguished members of the subcommittee, I appreciate your invitation to present the Navy's plans for aircraft procurement in fiscal years 1990 and 1991 and to update you on other significant programs which influence Navy and Marine Corps aviation's contribution to the current military strategy of the United States.

BUDGET OVERVIEW

As we enter the last decade of the 20th Century, Naval Aviation is embarking upon a critically essential modernization program, a program that is absolutely necessary in order that the United States Navy meets its global national security commitments of the 21st Century. Several programs have been terminated in earlier years (F-14A, EA-6B, A-6, AH-1, and P-3) in anticipation of urgently needed replacement programs on the near horizon. These new capabilities include the A-12, T-45 Training System, the P-7A, formerly known as Long-Range Air ASW Capability Aircraft (LRAACA), the F-14D, and the EA-6B ADVCAP.

The Aircraft Procurement, Navy (APN) request in the FY 1990 ABS is $8,826 million, a decrease of $488 million from the level appropriated in FY 1989. The FY 1991 ABS request is $9,518 million, an increase of $692 million over FY 1990. The requested funds in FY 1990 will procure a total of 140 aircraft, including 29 rotary wing, 5 training aircraft, and 106 fixed wing tactical aircraft. Because of overall budget constraints and affordability, modernization goals will be achieved at a slower rate than previously anticipated. Long-standing Congressional concerns on naval aircraft shortfalls and increasing average age should be alleviated in the late 1990s as a larger number of new aircraft begin to replace those whose service life is expended.

NAVAL AVIATION AND NATIONAL DEFENSE

As the leader of the free world, the United States is deeply and permanently committed to sea power for economic vitality and political stability. Globally, naval forces are the most visible reminder to our allies, friends and potential aggressors, of the United States' resolve to provide an umbrella of stability under which free world political and economic activity can flourish. The mobile and flexible forces of the Navy and Marine Corps contribute to global stability through their ability to confront potential aggressors and trouble makers with a broad range of military options--broad in geographic scope, rapid response time, and measured intensity. Our Carrier Battle Groups will continue to be the most respected, responsive, flexible and best prepared force, capable of reacting immediately, on a global basis, across the entire spectrum of conflict. The nation's diminishing access to foreign bases and overflight rights has the potential to limit forward basing of U. S. military forces. Our nation will increasingly rely upon mobile naval forces to fill this vacuum, deterring aggression and providing for regional stability. Our recent experience in the Persian Gulf serves only to reinforce this argument.

Carrier Battle Groups operate daily as they would in war--forward, near our allies, and where potential adversaries must be deterred. They operate throughout the world, with forces of our sister services and allies in maintaining necessary levels of readiness and training, not only to deter war but to fight and win should deterrence fail. Naval Aviation exercises in the environment and geographical areas in which confrontation would likely occur. The Carrier Battle Groups with their long range, modern, air arms can deploy for as long as necessary and fight at whatever level of conflict the situation demands. Naval forces can affect world events quickly and decisively, and once political or military objectives are realised, rapidly withdraw without leaving a ripple in the water.

Carrier-based aircraft, in conjunction with shore-based maritime patrol aircraft, add an unequaled dimension to sea power. Sea power is mobile and flexible with global reach. Air power add speed, altitude, and additional reach in a four-dimensional (surface, subsurface, land, air) warfighting environment. Carrier aviation can conduct offensive operations against targets ashore, afloat, or under the sea with the great advantage of rapid revisit capability. The ability of carrier-based aviation to employ the vast array of sensors and weapons required for successful antisubmarine and electronic warfare makes for an unmatched force multiplier. This concentrated offensive air power is an effective and highly visible deterrent which can freely operate independent of foreign shore bases, political constraints and the sovereign claims of other nations.

Unmanned air vehicles, cruise missiles, and other systems will develop as complements to air power at sea, but none will take the place of manned aircraft when the chips are down. When it becomes necessary to wrest and maintain air dominance over a battle space, when it becomes necessary to deliver heavy volumes of ordnance on a repetitive basis, when it becomes necessary to combat high speed, multi-threat and versatile undersea forces, and when there is a need for rapid and flexible logistics, there is and will be no substitute for air at sea.

For the present, our technological edge, better training, tactical initiatives and innovations, combined with the exceptional quality of our people, have given us the advantage. However, because our potential adversaries, Soviet Union and Third World alike, are rapidly acquiring improved weapon systems in every category, there is enormous justification for Naval Aviation to modernize at an accelerated rate.

NAVAL AVIATION PRIORITIES/ISSUES

The FY 1990/91 budget request will keep strong and flexible Naval Aviation forces on-station and fully ready to meet any commitment. Our top priorities are people, readiness and safety, a balanced force structure, and modernization.

People Programs. Maintaining adequate levels of motivated and well-trained people to man Naval Aviation is my highest priority. They are, of course, the heart of our capability, now and in the future. The American sailor and junior officers are the ultimate force multiplier over any potential adversary, but only well-trained and motivated personnel can maximize the use of the sophisticated weapons needed to wage modern warfare. We must continue to preserve the pilot training rate, the flying hour program, and technical training programs in order to meet commitments and retain our best people.

Our FY 1990/91 budget request represents an overall aviation manpower reduction, primarily related to force structure cuts. In fact, ship and squadron manpower has been reduced from 92 to the 90 percent level, with zero growth in shore-based billets. As a result, previously programmed growth was not attained. Fleet support capabilities ashore will be reduced along with the technical leadership and expertise necessary to support complex fleet weapon systems. Additionally, movement toward a better balance of sea duty tours and shore duty assignments has been delayed. If further manpower reductions are mandated, our capacity to bring new weapon systems on line effectively and to operate safely those presently assigned will be in question.

In an environment where manpower is stretched thin, retention has historically suffered. Retention of experienced officers and petty officers is intrinsic to readiness, economy and safety. Experienced personnel simply maintain and operate complex weapon systems more effectively, resulting in improved readiness and safety reflected by a lowered aircraft accident rate. Retention reduces training cost. In the case of pilots, these costs are dramatic; it costs approximately $1.25 million to train a fleet-ready aviator.

Based on initial returns, the aviation continuation pay (ACP) approved by Congress for FY 1989 appears to be successful; however it is too early to assess its impact on all aviation communities and designators. Additional incentives may be required for the nation to retain the proper number of pilots in military service. Growth in high tech industry means our well-trained officers and petty officers are highly sought after in the civilian sector. It is absolutely necessary that military salaries and benefits keep pace.

Readiness. Readiness must be maintained for maximum warfighting capability. Naval Aviation, the essential component of American sea power, must remain capable of keeping conflicts small (geographic, time and intensity) to avoid escalation. Today, forces on station are ready. This was demonstrated when Iranian warships and gunboats were put out of action as recently as April 1988 and when two attacking Libyan MIGs were downed in January 1989.

To ensure our crews remain ready, the President's budget will flying hours at the minimum standards required for safety and readiness. It will provide required training for aircrews at ra needed to maintain squadron readiness. It will provide for shore-based support infrastructure which protects the material readiness of carriers and aircraft while emphasizing safety, reliability, and maintainability in operations. Further deterioration in the infrastructure, though, will adversely affect readiness--our ability to respond on short notice wherever whenever required.

Balanced Forces. We must continue to provide a balanced Naval Aviation force structure which is optimized and modernized across all mission areas. The current force structure of 13 active and 2 reserve carrier airwings, three active and one reserve Marine Corps airwings, and the requisite number of maritime patrol squadrons and ASW helicopters provides that balance.

Modernization. Naval Aviation's modernization plan is both evolutionary (F-14D, EA-6B, E-2C) and revolutionary (A-12), applying the latest technology to achieve superiority and survivability against sophisticated threats. We will capitalize on what Naval Aviation does best while integrating the strengths of sister services and allies. We will increasingly develop standoff weapons and electronic warfare systems as force multipliers. Through commonality and modular design Naval Aviation will continue to consolidate the number of different aircraft and weapon types to save manpower and support costs.

Safety. Naval Aviation has just completed the safest year in history--by a landslide! The CY 1988 rate was 2.16 mishaps per 100,000 flight hours with 48 Class A mishaps. This betters last year's record rate of 3.25 and 74 mishaps. Thanks to inspired leadership and proactive awareness at the operator level, the Navy has 26 more aircraft to fly this year than last. Our success is due in no small part to the cumulative effects of adequate flight hours and spare part funding in past years which facilitated aircrew training. But we are not content to rest at this low mishap rate. As good as was 1988, we still had 48 too many accidents.

FORCE MODERNIZATION AND STRUCTURE

It is essential to gain maximum benefit from each budget dollar; therefore, improvements and added capability are limited to only those necessary to improve safety, meet operational requirements, extend service life, enhance survivability, and improve maintainability through reduced costs and lower manpower requirements. Maximum competition, fixed price contracts, block upgrades, optimum use of acquisition streamlining, maximum standardization and commonality, conversion-in-lieu of procurement (CILOP), and weapon system improvement programs (WSIP) are all being used to ensure limited resources are used wisely. We are participating, whenever possible, in joint-service development programs. For example, Navy is firmly committed to joint development of the NATF.

Aircraft Carriers. The decision not to add another deployable carrier at this time keeps their level at 14. This force level can support our peacetime deployment commitment as is the case today. As CVNs begin refueling periods, adjustments will be made to the carrier deployment schedule to maintain existing turnaround ratios and personnel tempo.

USS CORAL SEA is completing pre-deployment work-ups in preparation for a mid-1989 scheduled deployment to meet national treaty commitments. CORAL SEA remains fully mission capable as she approaches her revised projected decommissioning in early FY 1990.

USS MIDWAY continues to operate in the Western Pacific, fulfilling the nation's commitments to our Western allies and assisting in our necessary Indian Ocean presence.

The nuclear refueling and complex overhaul of USS ENTERPRISE, which begins in 1991, is a smart business decision which will ensure a first-line nuclear aircraft carrier (CVN) for an additional 20 years at a fraction of the cost for new construction.

Carrier Airwings. The Navy's near time complement of 13 active and two reserve airwings was planned knowing that one aircraft carrier would be in SLEP, one would be in a refueling overhaul, and one is generally in a complex overhaul.

Strike Aircraft. The A-12 is a revolutionary program which will improve our all-weather attack capability by an order of magnitude. Our top warfighting priority, it will incorporate significant stealth characteristics and become the primary striking force of the Carrier Battle Groups. This vital tactical platform will be able to penetrate even the most heavily defended enemy areas to reach its targets. The Air Force has joined us in the development of the A-12 and is defining an A-12 variant for their use.

Until all medium attack squadrons are A-12 equipped, we will continue to operate the long range, all-weather, A-6 Intruder. As an interim measure to ensure its survivability in the near term, we are modifying it under the System/Weapon Integration Program (SWIP). No SWIP modification kits are budgeted in either FY 1990 or FY 1991, however, further upgrades are required during the remaining A-6 lifetime. This will permit a greater stand-off capability with HARM, HARPOON, Infrared and Laser MAVERICKS, SKIPPER and SLAM (HARPOON variant), and additional reliability/maintainability upgrades.

The F/A-18 strike fighter with its versatility, reliability, and survivability will be the "workhorse" of carrier air wings well into the 21st Century. Upgrades to the radar, engines, weapon system, and "Under the Weather" capability will further expand the mission potential. The FY 1990 request is for 66 aircraft, the beginning of a multi-year contract.

The AV-8B Harrier program has been restructured over the past several years to represent a solid balance between fiscal resources and combat capability. At this time, we are short of our original requirement of 323 aircraft but this can be revisited at the end of our current multi-year contract. Operational experience with the AV-8B has shown the airframe to be reliable, maintainable, and capable of substantial growth. Night attack capability, upgraded engine, and perhaps a radar in the future will allow the AV-8B to expand its missions over a broad spectrum of operational and threat scenarios.

Amphibious Forces. The FY 1990/91 ABS terminates the V-22 Osprey program and requests a mix of substitute helicopters to perform the Navy and Marine Corps' missions. The MV-22 was a planned replacement for a number of aging CH-46/CH-53A/D medium lift helicopters. In view of the V-22 cancellation, the Department has proposed a mix of CH-60 and H-53 helicopters to satisfy the over-the-horizon medium lift assault requirements for the Marine Corps.

ASW Aircraft. Naval Aviation is the key element in antisubmarine warfare (ASW), the Navy's number one warfighting priority and a cornerstone of naval strategy. In any confrontation with the Soviet Union, their numerical superiority in submarines will require use of air ASW as a force multiplier. That multiplier is Naval Aviation--in the form of sea-based antisubmarine aircraft and land-based maritime patrol aircraft, specifically designed for the primary mission of dominating enemy submarine forces. ASW aircraft are the key to effective, coordinated ASW which links surface, subsurface and air elements through an increasingly sophisticated communications network. ASW aircraft are highly maneuverable, and quickly redeployable weapon platforms possessing the capability of simultaneous track and attack of multiple targets. ASW aircraft, such as the P-3C, S-3B, and SH-60b/F, can quickly reposition sensors and respond rapidly to long range ASW cues for either successful prosecution or false target elimination. In addition, aircraft can provide the frequently decisive element of battle--surprise. Our procurement plan, which is in consonance with the ASW Master Plan, is bound by affordability.

The P-7A, equipped with the Update IV avionics system, is the planned replacement for the older P-3As/Bs. In a cost cutting effort, we will early retire 73 of these older P-3A/B aircraft and temporarily reduce Primary Aircraft Authorization (PAA) in active and reserve P-3 squadrons. Our MPA force will operate with a reduced number of P-3 aircraft until the P-7A comes on line in sufficient numbers in the late 1990s. As we intend with all modernization efforts, the P-7A will be less manpower intensive and more economical to operate. The P-7A will provide significantly increased payload, greater range, and higher transit speed. Advance procurement funds are requested for FY 1991 with procurement to begin in FY 1992. We are also pressing ahe P-3C modifications by requesting needed funding to meet an increasingly sophisticated submarine threat; however, affordability has reduced Update III kit procurement and delayed program completion until 1994.

We are continuing to procure modernization kits for the S-3B WSIP. The excellent operational effectiveness which the S-3B aircraft has recently demonstrated during its initial at-sea operations clearly points to the benefits of a successful modification program. With the important role the aircraft now plays in the AAW and ASUW roles in addition to its primary mission of ASW, the S-3B has become a true force multiplier. Unfortunately, affordability has reduced the rate of S-3B kit procurement and delayed program completion until 1996.

The FY 1990/91 ABS defers the procurement of 18 SH-60F ASW helicopters to allow time to correct deficiencies discovered during follow-on test and evaluation. Timely correction of these deficiencies should result in a procurement profile which allows required replacement of the SH-3s as they reach the end of their service life. The SH-60B program is on track and performing well. Full funding in FY 1990 for six SH-60Bs will help fill inventory requirements on the LAMPS Mark III ships.

AIR DOMINANCE

Naval Aviation is working in conjunction with other warfare sponsors in developing an Anti-Air Warfare (AAW) Master Plan that will provide a fleet-wide assessment of force AAW capabilities vis-a-vis requirements into the early 21st Century. The purpose is to identify methods of making existing systems work best in coordinated operations and to outline RDT&E and procurement priorities for the next several years. In view of the Soviet Naval Aviation developments at sea, the AAW Master Plan will provide a roadmap to meet the increasing threat.

The F-14D is key to Carrier Battle Groups achieving air dominance. Mounting new high performance engines, a state-of-the-art digital radar, and new digital avionics, it will pace the threat and provide continued outer air battle capability to the Carrier Battle Group. Navy anticipated achieving an all F-14D force by the year 2000 through a strategy including both new procurement and remanufacturing the F-14A to the F-14D configuration. The FY 1990 ABS terminates the new production program but retains [illegible] remanufacture program. We anticipate a one-year delay in F-14D fleet introduction.

The Navy is working closely with the Air Force and its contractors in conceptualizing a carrier-based version of the Advanced Tactical Fighter (ATF) as a follow-on to the F-14D near the turn of the century. The Navy is fully committed to this development program.

The F/A-18 continues to fulfill its multimission requirements superbly, including fighter (self) escort, short to mid-range intercept, and F-14 augmentation in the outer air battle. The capability to perform strike and fighter missions allows the Carrier Battle Group Commander unparalleled flexibility in configuring the F/A-18 as battle situations change. The digital weapon system of the F/A-18C yields greater combat effectiveness by including the capability for AMRAAM and ASPJ. Development funding requested for the radar upgrade is absolutely essential.

The E-2C weapons system update program continues to be highly successful in meeting the evolving threat. The request for four E-2Cs in FY 1990 will continue to satisfy fleet inventory requirements; however, affordability has forced a one-year slip in the update development program (UDP II). Wing cracks continue to impact readiness. Twenty-six of the 101 E-2C aircraft in inventory are grounded for wing cracks. Full modification funding (APN-5), as requested, will keep the Navy's "get well" plan on track.

ELECTRONIC WARFARE

As the enemy gains electronic sophistication, so must the electronic combat systems supporting tactical air forces and carrier battle groups. The EA-6B remains the primary platform for suppression and degradation of enemy defense systems by tactical jamming and counter-target jamming support for battle groups and

Marine Corps forces. Funding in FY 1988 and 1989 for 12 aircraft each year will satisfy near-term inventory requirements. Because of affordability, additional EA-6B procurement has been terminated. This will necessitate careful management of our assets until arrival of the Advanced Tactical Surveillance (ATS) System. As a warfighting requirement, the EA-6B will be remanufactured into the Advanced Capability (ADVCAP) configuration starting in FY 1991. We are also requesting development funds for the Advanced Signal Receiver (ASR) as a top priority.

A top priority of battle group commanders is the accelerated modification of 16 ES-3 electronic surveillance aircraft from the existing S-3 inventory. The program continues to progress at an accelerated pace to replace the few remaining EA-3B aircraft. Any delays in this program will adversely impact fleet capability and readiness. ES-3 squadrons are scheduled to stand up in Guam and Rota Spain in 1991.

Advanced Tactical Surveillance (ATS). FY 1990 includes our first request for ATS development funds. ATS is being developed to perform the battle management, surveillance, and multi-dimensional warfare missions currently accomplished by the E-2C, S-3A/B, EA-3B/ES-3B, and EA-6B. ATS is envisioned to be a common airframe/engine developed from a current derivative air vehicle, though the final decision has not been made on what platform will incorporate it. It will encompass a common baseline avionics architecture which allows the integration and exploitation of a multi-spectrum sensor suite, common signal/data processing hardware and software, standard DOD data bus structure and reconfigurable controls and displays. The baseline ATS will require, as a minimum, two major variants due to mission-specific sensors and weapons requirements (Battle Management/AEW and Battle Management/ASW), with common netting, C3, EW, and SIGINT capabilities.

Training. As Naval Aviation fields the most sophisticated and capable weapon systems in history, training for both the operator and maintainer becomes even more important. Training is a "force multiplier" which gives us the edge in readiness for combat. Training includes flight hours, classrooms, training support equipment, facilities and targets, adversary aircraft, simulators, training devices and adequate Temporary Additional Duty (TAD) funding to accomplish available training. Technology now allows simulators which virtually replicate real world threats and our own weapon system capabilities. We are on the threshold of true mission rehearsal and a deployable trainer is in the near future. The initial training in the operation and maintenance of complex weapon systems is best and most economically conducted first in simulators. It is absolutely essential that training devices and simulators be funded parallel with new aircraft systems and modifications and they arrive before the delivery of the first aircraft or modification, not after.

The T-45 Training System consists of the T-45A "Goshawk" jet trainer, state-of-the-art visual and instrument simulators, computer based training integration system (TIS), computer aided instructional devices, academics, courseware, and contractor logistics and maintenance support.

The first two flight test aircraft were accepted by the Navy in 1988 and were used for initial operational and developmental flight testing during November 1988. During this initial flight testing, deficiencies were discovered in lateral and longitudinal stability, engine response and total engine thrust, speed brake operation, and several areas of human factors. All deficiencies are correctable, and the Navy is working closely with the prime contractor (Douglas Aircraft) to resolve these problems in the most timely manner possible. A slip in initial operational capability (IOC) of two to five months from the original IOC September 1990 is likely, but no major impact on the ability to meet pilot training requirements is projected. FY 1990 procurement of the T-45 has been deferred until deficiencies are corrected.

Aircraft Modifications. The FY 1990 request is significantly scaled back to $601 million from the $932 million appropriated in FY 1989. This reduction will improve the balance between modification kit procurement (APN-5) and installation funding in the O&M,N request. However, modernization reflected in the APN-5 account is at the absolute minimum acceptable level.

AVIATION SUPPORT EQUIPMENT

Our request for support equipment in FY 1990/91 is essentially level with the amount appropriated last year. The appropriations provided from FY 1984 through FY 1988 have been dedicated to fully outfitting 15 deployable carriers. Full funding as requested in FY 1990 is needed to provide initial Consolidated Automated Support System (CASS) production, CV replenishments, required support equipment for aircraft procurement, and the replacement of obsolete equipment.

CASS is an automatic testing system for Navy weapon system electronics support. It consists of standard hardware and computer software to which functional modules are added to meet different testing requirements, such as communications, radar, and electronic warfare. Once designed, the modules can be quickly and inexpensively produced and replaced. Maintaining CASS development on schedule is essential for the support of the A-12 and all future aircraft and new common avionic systems. CASS offers significant savings in manpower, training, support equipment, operating cost, space, and combat readiness.

READINESS AND SUSTAINABILITY

The FY 1990/91 budget is balanced to sustain the high state of day-to-day readiness required by Naval Aviation tactical forces through prudent investments in training, personnel, and material support programs.

Flying Hours - An Imperative for Fleet Readiness. The standard readiness indicator for the flying hour program is the primary mission readiness (PMR) attained by warfighting units (TACAIR/ASW). For each type aircraft, a pilot needs to be trained in various mission skills--skills which must be continually renewed for proficiency. Through experience, we have determined the average number of hours per month required to achieve and maintain these skills. Our budget development process is designed to identify the minimum funding levels necessary to provide the flight hours to maintain crew readiness. The FY 1990 budget request is sufficient for us to achieve 85 percent of that level through flying and to gain an additional two percent PMR through the use of simulators. The planned 87 percent PMR is short of our peacetime goal of 88 percent. We know that further reductions below this goal will result in a loss of readiness, a reduction in safety, and a decline in pilot retention.

Air wings preparing for deployment and those already deployed are accorded priority for flight time while those returning receive less. The average TACAIR/ASW crew flies 25 hours per month. We believe this reflects the absolute minimum for retention of critical combat flying skills. However, it must be emphasized that the opportunity to fly is critical in the retention of aviators. Most aviators would say 30 or 40 hours per month in a Navy tactical aircraft would satisfy their flight desires and provide an incentive to stay in the Navy despite deployments and other hardships. Individual averages today are far below that level.

Airspace. Another separate, but related, issue is the availability of adequate Special Use Airspace to maintain Naval Aviation readiness. Special Use Airspace is essential for attaining acceptable flight crew proficiency across the full spectrum of warfare, for developing and evaluating airborne tactics, and for testing and evaluating advanced technology aircraft and weapon systems. Low observable and terrain hugging aircraft, high-speed missiles, and over-the-horizon standoff weapon systems and tactics are but a few examples of added capabilities that increase airspace and sea area requirements.

Increased emphasis on joint operations place additional demands on airspace size and frequency of use. Available airspace, though, is under increasing pressure from commercial air, economic, political and environmental sources. Each source is represented by special interest groups which compete with military interests. The Navy is faced with the dilemma of requiring increased airspace to support emerging capabilities, while current trends are reducing available areas and restricting their use. This places readiness at risk. We are working hard at solving the myriad of problems attendant, but I would much appreciate the Members' understanding of our dilemma.

Aircraft Material Readiness. While many factors, including personnel, training, general logistics support, spare parts, and depot rework funding, affect material readiness, the primary indicator used to measure aircraft material readiness is the

Mission Capable (MC) rate. The MC rate goal is 73 percent, which was achieved in FY 1988. Funding in areas affecting MC rate decreases from FY 1987 to FY 1991. The result is expected [illegible] a decline of about one percent per year in the MC rate from FY 1988 to FY 1991.

Aviation Spares. The FY 1990/91 aviation spares account has been pared to bare minimum requirements and represents our best efforts at a balanced approach within the limits of affordability. We plan to procure 100 percent of engine spare parts requirements which directly affect Mission Capable rates and 70 percent of an avionics system's repair parts which has direct affect on Full Mission Capable rates but does not affect Mission Capable Rates. As in recent years, reduced funding for spares will require intensified management efforts that include increased cannibalizations, additional "crossdecking" of assets, off-s[illegible] requisitions, and increases in maintenance man hours.

Shore Station Support. Naval air stations provide the environment critical to maintaining the readiness of Naval Aviation. Air stations, operated and maintained by a mixed military/civilian and contractor work force, must be adequately funded to provide a sufficient level of support for aircraft operations and maintenance. We continue to seek innovative ways to minimize shore station costs through functional consolidation, efficiency reviews and Circular A-76 studies. The current budget allocates the bare minimum for air station operations. Further budget reductions to Base Operations Support funds would have a dramatic impact on our ability to maintain air station operations at safe and efficient rates, or it would require additional base closures.

WEAPONS DEVELOPMENT/PROCUREMENT

Power projection is carrying the fight to the enemy and putting ordnance on target. Sufficient quantities of practice ordnance are essential to accomplishment of that objective. Skills must be maintained on a continuous basis during peacetime. The CINCs' number one concern is the shortage of weapons required to carry out their missions. Although increased weapons procurement in recent years has all but eliminated the requirement to cross-deck weapons on deploying combatants, we still have not filled the resupply pipeline and forward prepositioned inventories of several of the newer, more sophisticated weapons like HARM, IIR MAVERICK, PHOENIX, and HARPOON. However, we believe the quantities reflected in the FYDP are an acceptable risk in this funding environment.

Several weapons are worthy of special mention because of their contribution to warfighting enhancements. We are proceeding with the development of the AIM-9R as a top priority. It features an improved capability in clutter and a significant counter - countermeasure capability. We are continuing the development of AAAM, AMRAAM, Standoff Land Attack Missile (SLAM) and the Advanced

Interdiction Weapon System (AIWS). Our goal is to "neck down" the different types of weapons in the fleet.

The increased Congressional funding of $35.0 million in FY 1989 for sonobuoys will help meet inventory requirements and future consumption requirements for ASW training while sustaining war reserves. The FY 1990/91 request has been reduced to the lowest prudent level. Even though expenditure rates may exceed FY 1990 procurement quantities, accumulated inventories will support the required ASW operational tempo in the near term.

The reduction in air-launched training ordnance mandated by fiscal constraints is somewhat offset by the increased request for MK-82 General Purpose Bombs which will permit continued use of live training ordnance. However, this level of funding is still at the absolute minimum to avoid erosion of war reserves and to maintain an acceptable level of ordnance delivery capability. The most optimistic future outlook rests on the early IOC (FY 1995) of the Advance Bomb Family (ABF).

SUMMARY

Sea power is essential to the nation and to national objectives. Naval Aviation adds dimensions to sea power that are not available from other means. Naval aircraft provide reach, flexibility, versatility, speed, and concentrated firepower. They are quickly reloadable. The FY 1990/91 ABS emphasizes readiness, retention of experienced manpower, and force modernization which will allow Naval Aviation to continue meeting national commitments.

People must always remain our top priority. Our people ask for very little. They willingly deploy throughout the world, enduring six-month separations from their families and friends on a routine basis. They do so from a deep sense of commitment and love of country. We must return their commitment and devotion to duty with adequate pay and benefits, providing a secure financial environment for their families. This is a key element in protecting our national investment in a ready Navy.

We must likewise provide sufficient funds to maintain a balanced naval capability centered on 14 deployable Carrier Battle Groups. Our Carrier Battle Groups are the centerpiece of our naval capability because they represent the most effective and complete way to establish and maintain control of the seas. There is no substitute for them in peacetime or in war. In order to pace the emerging threat in the coming decade, we must introduce on schedule the technologies represented in new weapon systems, such as the A-12.

Naval Aviation makes extraordinary contributions to national security. The continued support of Congress in protecting our investment by providing measured real growth, coupled with the dedication of our courageous professional men and women in Naval Aviation, will ensure our strong contribution continues.

STATEMENT OF LT. GEN. CHARLES H. PITMAN, DEPUTY CHIEF OF STAFF FOR AVIATION, MARINE CORPS, DEPARTMENT OF THE NAVY

General **Pitman**. Sir, I will stand primarily on my written statement, but I would like to say, Mr. Chairman, that I welcome the opportunity to be here today for my first baptism under fire and stand ready to answer any questions you might have.

PREPARED STATEMENT OF LT. GEN. CHARLES F. PITMAN

Mr. Chairman; Distinguished Members of the Subcommittee:

I appreciate this opportunity to update you on the status of Marine aviation and present our plans for aircraft procurement in fiscal years 1990 and 1991. We are well aware that much of the success your Marine Corps now enjoys is directly attributable to the continuing support of Congress, and we are committed to providing you, and our Nation, the most combat-capable force that we can within the funding allocated. My report to you today will discuss Marine aviation, how we performed in 1988, what programs we are proposing for your consideration in the Budget before you, and a brief overview of our future warfighting requirements.

Your Marine Corps has traditionally been characterized as "lean and mean", and has prided itself on its ability to use allocated resources effectively. Since its birth in 1912, Marine aviation has been a part of this tradition. We are constantly striving to ensure that our aircraft training, readiness, and modernization programs conform to this proven principle which has served us so well.

1988 IN REVIEW

Last year, aviation safety was a major success story for the Marine Corps. Marine aviation enjoyed its lowest accident rate in history--2.68 class A accidents per 100,000 flight hours. Every Marine can take pride in the part their uncompromising vigilance contributed to the aviation safety record. The savings to our nation in material and lives is noteworthy.

The CY-88 safety record is a direct reflection of the attention to detail in planning and day-to-day operations, and the return on your investment in modern state-of-the-art systems. In 1988 we flew 350,000 tactical flight hours; had a 76.5% mission-capable readiness across all aircraft communities; participated in over fifteen major live-fire exercises in such places as Twentynine Palms, CA, the Philippines, and Australia; had combined operations with over twenty countries; and global deployments from the Persian Gulf to northern Norway.

The quality of our aircrew, maintenance, and support personnel has never been better. We have also realigned our personnel structure as a part of the Marine Corps' 2,900-man end-strength reduction. We stood down an Aircraft Group Headquarters (MAG-15) in Iwakuni, Japan, incorporating its squadrons and support personnel into the other Iwakuni-based group, MAG-12. We reorganized our Marine Wing Support Groups, and our HAWK Missile Battalions, reducing the number of personnel and moving some of the heavy equipment into the Reserves. Thus, we entered 1989 with a leaner but safer, more capable force.

FY90/91 BUDGET AND THE AVIATION PLAN

Marine aviation continues to improve its capability to support Marine Air-Ground Task Force (MAGTF) combat requirements. These requirements are drawn from our expeditionary role in support of the Amphibious Strategy and as the nation's premier force in readiness.

Marine Corps planning has undergone considerable revision, and so has the assessment process by which Marine aviation requirements are developed. The process begins at the Marine Corps Combat Development Command (MCCDC) at Quantico, where Marine Corps doctrine and planning has been centralized. Using inputs from CINCS and FMF commanders, MCCDC planners develop the MAGTF Master Plan (MMP) which contains a prioritized list of capabilities to meet mission requirements for all levels of conflict. Subordinate plans which identify changes in doctrine, organization, training, equipment, and facilities necessary to satisfy the capabilities, are developed for each of the four MAGTF elements (Command, Aviation, Ground, and Combat Service Support). The Aviation Combat Element subordinate plan is called the Marine Aviation Combat Plan (MACP).

Aviation planners at Headquarters Marine Corps assess the MACP requirements and apply Defense Guidance, manpower limitations, support requirements, and studies to develop constrained requirements which are incorporated into the Marine Aviation Plan (AVPLAN).

The AVPLAN ensures that Marine aviation remains responsive to MAGTF warfighting requirements and procures equipment which increases combat efficiency across all aviation communities. The range of our efforts is far-reaching. In FY90/91, the Marine aviation programs in the budget request reflect the movement toward greater expeditionary capability, night all-weather operations in a high threat missile, laser, and chemical environment, and a greater heavy lift capability while maintaining effective command and control. All aviation force structure decisions, doctrinal changes, tactical development, training programs and technology decisions are driven by the fundamental question--how will the change add to the Marine Corps' combat capability?

Programs requested in the FY90/91 budget reflect an assessment of their contribution to these objectives and to the six functions of Marine aviation--anti-air warfare, offensive air support, assault support, aerial reconnaissance, electronic warfare, and command and control of aircraft and missiles--as they support MAGTF warfighting requirements. I would like to briefly recap what each of these functions provides for the MAGTF commander.

Anti-air warfare provides the air superiority over the battlefield that is essential to successful operations. The F/A-18 aircraft and the ground-based HAWK and Stinger missile systems are employed as an integrated air defense system designed to destroy enemy air and missile threats.

Offensive air support delivers firepower against enemy forces for the destruction, neutralization, or interdiction of installations, equipment, and personnel. The A-6E, AV-8B, and F/A-18 provide the MAGTF commander with the heavy firepower lacking in the light, expeditionary ground combat element.

Assault support provides mobility, close in fire support, and logistic support for the MAGTF. Our four types of helicopters--heavy lift (CH-53), medium lift (CH-46), attack (AH-1W), and utility (UH-1N)--provide mobility with which to apply force and the logistical support to sustain the effort. Attack helicopters provide close in fire support, and utility helicopters act as command and control and medical evacuation aircraft. The assault support force is rounded out by KC-130s which provide aerial refueling and other assault support missions.

Aerial reconnaissance and electronic warfare provide the commander with vital combat tactical and strategic information. The RF-4B is our tactical photographic reconnaissance aircraft and the EA-6B provides electronic information as well as the ability to jam enemy radars and communications. Plans call for future versions of the two-seat F/A-18D to replace the aging RF-4B. The OV-10 provides visual reconnaissance as well as the ability to act as an airborne Forward Air Controller in a low-intensity conflict.

The control of aircraft and missiles is provided by the Marine Air Command and Control System, which ties the other five functions together into a single, coordinated structure for the force commander.

Technology is now available that gives Marine Corps rotary wing and fixed wing aircraft the capability to overcome many of the obstacles posed by night and adverse weather--permitting aviation support for around-the-clock MAGTF operations. The AV-8B and F/A-18 Night Attack Systems, AH-1W Night Targeting

System, CH-53E Night Vision System, and the OV-10D+ Night Observation System reflect our commitment to this capability.

Advanced technology is being introduced only where there is an absolute assurance of increased reliability and maintainability in austere expeditionary combat environments. The Marine Corps must modernize its aviation force to field one that is completely capable of operating in an expeditionary environment. We have capitalized on revolutionary concepts such as Vertical/Short Takeoff and Landing (V/STOL). Where possible, we will exploit these concepts in developing multi-mission expeditionary-capable variants, such as an Attack/Observation aircraft (VMAO) and an Advanced Short Takeoff and Vertical Landing aircraft (ASTOVL), to replace other aircraft and fulfill our warfighting needs well into the next century.

V/STOL is a concept critical to providing the mobility and support required on tomorrow's battlefield. Studies and exercises have shown that reliance on the fixed air base requires an unacceptable drain on manpower for security and provides a lucrative target that can easily be rendered unusable to traditional aircraft. All too often, traditional airfields are too far to the rear, causing delays in responsiveness to ground combat element support requirements.

As we approach the year 2000, we hope to reduce the number of different aircraft type/model/series (TMS) in the Marine Corps' inventory. The goal is to decrease the number of people required to support our weapon systems and simultaneously increase mission effectiveness in terms of aircrew and aircraft performance. Done properly, we can improve the potential for victory on the battlefield while reducing the cost of our combat-ready force.

RESERVE AVIATION

Marine Reserve aviation exists to augment and reinforce the active aviation forces in the event of mobilization, and to serve as the nucleus of a Fourth Marine Aircraft Wing.

As the active Marine aviation forces are modernized and reduced in TMS, the same efforts are being applied to the Reserves. The modernization of the 4th Marine Aircraft Wing is the subject of a comprehensive Marine aviation review.

The Reserve F-4S squadrons are beginning their transition to the F/A-18 and the first squadron will be completely equipped by September 1989. The aggressor squadron in Yuma, Arizona received F-5s in April 1989 as a replacement for their Israeli F-21 KFIRs. Thanks to your support, the Marine Corps continues to receive new KC-130Ts for the Reserve units at Glenview, Illinois and Newburgh, New York.

The fundamental goal in the achievement of the total force concept is Reserve aircraft and system commonality with the active forces. Budgetary constraints are slowing down efforts to modernize our Reserve aviation assets as quickly as we had anticipated.

ROTARY WING MODERNIZATION

ASSAULT SUPPORT. The FY-90/91 amended budget requests a CH-53/UH-60 mixture to supplant the MV-22. We are currently assessing how this mixture and other possible options can alleviate our medium assault support shortfall. Moreover, we must ensure that the Marine Corps has a viable warfighting capability into the 21st century.

CH-53E. The CH-53E is the Marine Corps' only heavy-lift support helicopter. The CH-53E provides the ground commander the operational flexibility he needs to reposition artillery and light armored vehicles (LAV's), to recover heavy equipment and aircraft, and to deliver the large quantities of supplies to wherever they are needed on the battlefield.

We currently have two CH-53E squadrons operating at New River, North Carolina and two at Tustin, California. Equipped with 12 aircraft each, these squadrons support continuous deployments in the Mediterranean and the western Pacific, FMF and JCS exercises, and both ground combat and aircrew training. Fiscal year 1989 procurement is the last year of a very successful four-year multi-year procurement which saved an estimated $98M. This procurement plus 23 planned for FY90 will bring our total to 125 aircraft.

AH-1W COBRA. The AH-1W is the Marine Corps' attack helicopter. It is a significant improvement over the AH-1T weapons system in operating capability. The AH-1W fulfills the mission requirement to provide enroute protection of assault helicopters. Additionally, it is used for landing zone fire suppression, close-in fire support, destruction of enemy armor, and defense against enemy attack helicopters.

The ongoing modification program which converts AH-1Ts to AH-1Ws and our previous procurement of 78 aircraft will bring our active force total to 115 aircraft organized into one training and six tactical squadrons. The Reserve force, however, is flying the older model, Vietnam-ea, AH-1J helicopter. The AH-1J does not have anti-armor or point-target weapon systems and is extremely limited in night-fighting capability. Our plans include AH-1Ws for the Reserve force. Procurement has not been possible because of budgetary constraints.

The Night Targeting System is a U.S. and Government of Israel joint RDT&E program which will greatly enhance the AH-1W night-warfighting capability. It is on schedule and we expect first deliveries in FY93. The Night Targeting System will enable aircrew to locate, designate, and fire on targets at night with their anti-armor weapons, HELLFIRE and TOW missiles, 20MM gun and 2.75 rockets.

FIXED WING

Marine Corps fixed wing aviation is also the subject of modernization plans. As with rotary wing aviation, the emphasis is on reducing the number of aircraft TMS and increasing our warfighting capabilities. By late FY95, we hope to see the

Reserve force equipped with the same types of tactical jet aircraft as the active forces.

F/A-18 HORNET. The Hornet fulfills both our air-to-air and air-to-ground mission requirements and can be operated from conventional or expeditionary airfields or from aircraft carriers. The F/A-18 incorporates state-of-the-art technology such as digital fly-by-wire flight controls, multi-mode radar, and use of lightweight composites to enhance the combat capability and flexibility of the aircraft. We have plans to upgrade it to meet our tactical reconnaissance missions and replace other TMS aircraft.

The F/A-18 provides a modern offensive and defensive anti-air capability to the MAGTF. Advanced avionics allow the Hornet pilot to accurately navigate, to strike enemy ground targets with the latest array of air-to-ground ordnance, and to detect and destroy enemy aircraft. The Hornet's versatility makes it deployable, sustainable, and effective across the spectrum of conflict. Increased operational reliability has improved the F/A-18 sortie generation rates while superior aerodynamic design, maintainability, and multi-mission capability make it particularly well-suited to the needs of the MAGTF in an austere expeditionary environment.

The newer and latest version of the F/A-18, the F/A-18C, is currently being introduced into our three fighter/attack squadrons in Hawaii. If the currently planned procurement continues, we anticipate having an all-F/A-18 fighter/attack force by late 1990s.

AV-8B HARRIER. The AV-8B Harrier will be the keystone of the Marine Corps' light attack forces well into the 21st century. It is the primary aircraft for providing critical, timely close air support to the ground commander. The AV-8B is an extremely effective and efficient aircraft in this role because of its modernized weapon systems, combat radius, and basing flexibility. The Harrier's ability to operate from roads, ships, grass fields, or prepared airstrips permits the quick response needed by the ground commander--bombs on target within 20 minutes after request.

An expeditionary force like a MAGTF is relatively "light" in organic heavy artillery and tanks, and must heavily rely on its tactical aircraft to provide the required fire support. The V/STOL-capable AV-8B is well-suited for providing dedicated close air support to Marine ground forces. The AV-8B has shown its performance and versatility around the globe in all types of conditions.

The Marine Corps active force will have an all-AV-8B light attack force by early 1992 following the conversion of VMA-214, the last active A-4M squadron. The AV-8B community has taken the lead in the development and fielding of night vision devices and compatible cockpit lighting for fixed wing aircraft. The first AV-8B night attack aircraft will be delivered to MAG-13 in Yuma, Arizona in September 1989.

The Marine Corps requirement is 323 aircraft to support the Force (8 squadrons X 20 A/C = 160 plus pipeline, attrition, and a training squadron) through year 2006. The present multi-year procurement contract--24 aircraft per year for three years--will bring our total procurement to 276 aircraft.

ALL WEATHER ATTACK. The venerable A-6E presently fills our all-weather attack requirement, but a replacement is clearly in order. Until recently, the A-12 has been the only viable alternative for the A-6E replacement, and Marine participation in the program was necessary to meet MAGTF all-weather attack requirements. Present fiscal constraints and the questionable expeditionary utility of the A-12 have necessitated a re-examination of our earlier position. Therefore, the Marine Corps is looking at the F/A-18D to supplant the A-6E. Essential modifications are planned to upgrade the radar and give it an all-weather attack capability. An F/A-18D with an all-weather attack capability would significantly reduce the TMS in our force and provide a lower-cost alternative to the A-12.

MARINE AIR COMMAND AND CONTROL

The Marine Air Command and Control System coordinates all of the functions of Marine aviation. It provides the commander with the means to integrate all of the other functions of Marine Aviation to fulfill the requirement for continuous aviation support. The Marine Air Command and Control System modernization is well underway.

MATCALS. The Marine Air Traffic Control and Landing System (MATCALS) is a tactical air traffic control program designed to replace the precision/surveillance radars and operating shelters of the Marine Air Traffic Control Squadrons. This system will replace the AN/TSQ-18 equipment developed in the late 1950's and will provide a highly automated, software-intensive, air traffic control system designed to increase aircraft landing rates and flight safety. The first of 17 systems was delivered to the Fleet in 1986 and Initial Operational Capability (IOC) is scheduled for 1990.

TACTICAL AIR CONTROL MODULE. The Tactical Air Control Module (TAOM) AN/TYQ-23 is a transportable, modularized, software-intensive, automated air command and control system. It is capable of controlling and coordinating the employment of a full range of air defense weapons, interceptors and surface-to-air missiles in support of the MAGTF. The AN/TYQ-23 command and control system is engineered to provide a modular operational capability in support of Marine Expeditionary Brigade (MEB) and Marine Expeditionary Force (MEF)- sized operational units and associated deployments.

GROUND-BASED AIR DEFENSE

Further warfighting enhancement is provided through reorganization of our ground-based air defense weapons systems, HAWK and Stinger. This realignment effort provides a balance of close-air and medium-range firepower for all levels of MAGTF composition. Procurement of both HAWK and Stinger are joint ventures with the Army through cost-effective multi-year procurement (MYP) programs.

The HAWK expansion and improvement plan includes the phased activation of the 1st Light Anti Aircraft Missile (LAAM) Battalion in III MEF. The ultimate goal is three active HAWK battalions of two "square" batteries each. Fourth LAAM Battalion in the Reserve force will grow to four "square"-configured batteries.

The Low Altitude Air Defense (LAAD) expansion plan reflects the reorganization of Forward Area Air Defense Batteries (FAAD) into LAAD Battalions. A dedicated LAAD Btry of 45 Stinger teams is available for each MEB, while the 90 Stinger teams of the active force LAAD Battalion support the MEF. In the near term, the reserve 4th FAAD Btry will expand into battalion organization. Future plans also call for the creation of two additional firing batteries in the 4th LAAD Battalion structure which will result in 180 Stinger teams in the Reserve force.

READINESS AND SUSTAINABILITY

If our aircrews are to be effective in battle, they must train as they would fight. Our flight hour program has allowed our aircrews to attain and maintain proficiency. It is currently funded at the minimum level required to continue their proficiency. Your support in this area is essential if we are to maintain an effective level of readiness.

Last year we reported that our inventory of air-launched ordnance was below the level necessary for training readiness and sustainability. This situation has not changed, nor is it likely to improve in the near term. The future inventory of air-launched weapons will be dependent on adequate funding.

CONCLUSION

In this year's posture statement I have focused on modernization programs. I feel a strong need at this critical time in defense budgeting to stress Marine aviation's number one requirement--a sound and consistent investment in the future of Marine aviation. The changing nature of future battlefields and the need for the right mix of people, equipment, and tactics are critical to our success. Our Marines at the Combat Development Command in Quantico, Virginia, and at Marine Air Weapons Training Squadron-1 in Yuma, Arizona, work hard to develop the equipment, tactics, and training we need to ensure that we are not surprised on the battlefield.

We in Marine aviation are very appreciative of the efforts of the American people and Congress in support of our programs. We have worked hard to build an expeditionary force-in-being second to none, ready on a moment's notice to deploy, sustain operations, and fight and win on any battlefield in the world over the full spectrum of conflict.

Investments in force structure sustainability and readiness have paid off. Our training and readiness, war stocks, and people programs have resulted in an aviation force that is lean, tough, fit, and capable. Now is not the time to let up. With your support for our programs we will remain this nation's most efficient and effective expeditionary warfighting force.

The **Chairman**. I want to welcome you, General Pitman. General Pitman and I have some mutual friends that go back to high school days, so welcome before the committee, General Pitman.

General **Pitman**. Thank you, sir.

The **Chairman**. Any other comments by any of the witnesses before we go to the questions?

Mr. **Pyatt**. No, sir.

The **Chairman**. Mr. Skelton.

Mr. **Skelton**. I have no questions at this time. I might a little bit later. But I wish to say to Vice Admiral Dunn, you had an excellent, superb career, and our paths have crossed now in three of your assignments, and we wish you the very best.

We welcome Lieutenant General Pitman, who crossed our paths around the world those many years ago.

I will reserve my questions for right now.

The **Chairman**. Larry Hopkins.

Mr. **Hopkins**. Thank you, Mr. Chairman.

Mr. Secretary, I was just reading your statement here, and you spoke of the reasons that the V–22 was canceled. You name one, substantially behind schedule; two, over cost; development problems not yet resolved; alternative platforms available to accomplish Marine Corps troop heavy lift requirements.

If we were to use that criteria, we would cancel virtually everything we have in inventory, Mr. Secretary, as far as being behind schedule, B–2, is an example.

Mr. **Pyatt**. Well, I am only talking about Navy programs, sir, so we need to focus on those. But as I mentioned earlier, we have supported the V–22 for a long time, got it this far, and then we have a budget crunch, and you have to take a look at what programs should survive and which ones shouldn't.

In this—we would like to have the V–22 or otherwise we would never have started it. It looked like it had an advantage, but then when you come around to deciding now in a reduced budget environment what continues and what doesn't, some things fall out on the margin, and that was what happened there.

Mr. **Hopkins**. Let me ask you, you mentioned you had some difficult choices; nobody denies that. I'm not indicating today that I am not going to support you. I may very well do that, but I would like to know what were your alternatives. What else did you consider besides that? What was left on that you didn't cut in lieu of, say, the V–22? What were you looking at besides that to meet your budget crunch or your intent to meet the Navy's portion of the $10 billion cut besides the V–22? What else did you look at to cut?

Mr. **Pyatt**. In the deliberations that went on with OSD, we originally had the V–22 in our program and had made our portion of the cuts with various other programs. I didn't bring the list here, so I can't recall it accurately.

Mr. **Hopkins**. Could you supply that to the committee?

Mr. **Pyatt**. Yes, sir.

Mr. **Hopkins**. What is the status of the V–22 contract right now with Boeing?

Mr. **Pyatt**. The current status is that the company has told us they have expended the funds available and would like to not continue. We have told them they are obligated to continue under the terms of the contract.

Mr. HOPKINS. So what you are saying is you are going to continue to spend money through 1989, or are you going to be issuing a stop order sometime soon? What are you going to do?

Mr. PYATT. Well, the funds were appropriated to continue the program. Until another decision is made, I think that is what we should do.

Mr. HOPKINS. What do you suggest we say to the taxpayers when we spent $2.5 billion in developing the V-22 to turn around and cancel it after it is beginning flight tests?

Mr. PYATT. Well, I think that we put—as I say, we put together a program based upon our projection of what was going to happen in defense. That projection didn't come true, and something had to fall out, and that is what did.

We would like to carry it on, but we don't have the money to do it.

Mr. HOPKINS. Admiral Dunn, during Secretary Cheney's appearance before this committee, he mentioned that one of the reasons behind his decision to cancel the F-14D was the intolerable unit price of each aircraft. If I recall correctly, he used a figure of somewhere around $75 million per airplane. Do you agree with that figure?

Admiral DUNN. It depends on what period of the program you assess the cost, Mr. Hopkins.

Mr. HOPKINS. How do you compare that?

Admiral DUNN. In the first year, the unit price would be about what you quoted. Over the life of the program, the unit price is much less.

Mr. HOPKINS. Well, how do you compare that with the $32 million figure that Grumman is using around the Hill?

Admiral DUNN. I believe you would have to ask Grumman on that, but I believe they are using the total program cost, the cost over the life of the program.

Mr. HOPKINS. Let me ask you, is $75 million too much to pay for an F-14?

Admiral DUNN. If we paid $75 million for each F-14, that would be too much, but when you consider that we are buying—we were proposing to buy a series of F-14, then the price would come down over time. Then we are paying a fair price, for the most part.

Mr. HOPKINS. Is the Navy fully and irreversibly committed to the Advanced Tactical Fighter (ATF) program?

Admiral DUNN. As of now, the Navy is irreversibly committed to the ATF program, to procuring a Navy variant of the ATF. We have to caveat that to a certain extent, of course, because if for some unforeseen reason, technical or otherwise, we cannot make a Navy variant come off, we would have to change. But at this time, we are fully committed. We have money in the program, we are working closely with the Air Force to develop a Navy variant of the ATF.

Mr. HOPKINS. My time has expired, Mr. Chairman. Thank you.

The CHAIRMAN. Roy Dyson.

STATEMENT OF HON. ROY DYSON, A REPRESENTATIVE FROM MARYLAND

Mr. Dyson. Thank you, Mr. Chairman.

Mr. Secretary and other members of the panel, I understand the situation with the budget and I am sure that you would fund everything that you could if given additional revenue. But one of the things that concerns me, as Mr. Hopkins, is the F-14D aircraft and also the EA-6B aircraft. First of all, I would like to offer a statement. I also have a number of questions that I would like to submit for the record.

I see today in your testimony we have been told there's no substitute for air at sea. Furthermore, I note that not only do we face threats from advancing Soviet technology, our military personnel also faces a very real risk from improved weapons available to the growing Third World nations.

Our participation in losses in the Persian Gulf have shown that protection of our naval fleet must remain a priority for the Navy. Therefore, I am extremely concerned about the plan to cancel the F-14D, which has proven itself to be one of our best aviation procurements.

In addition, I am concerned that other aspects of our fleet air support system may be forced to provide inadequate protection due to a lack of available aircraft. This will not happen in 1990, but it will happen in the out years and will be a very real problem if we do not look at those needs today.

One of the things that concerns me is that I am wondering if you will today revisit some of these funding decisions to ensure that our fleet and its personnel receive the protection that they deserve.

I think I see in Admiral Dunn's testimony, the printed testimony, one of the things you say on Page 14 is the F-14D is key to the carrier battle groups achieving air dominance. I am not going to read that whole paragraph, but as I said, I would like to ask the Chairman if I can offer some questions that you could respond to on both the F-14D and the EA-6B. How are we going to meet those requirements if we go along with the present schedule?

Mr. Pyatt. Fundamentally, the F-14D is not canceled. The manufacture of new airplanes was the part that is not included. We plan to redo the fleet and improve their capability as part of maintaining the force structure.

Admiral Dunn. Following on to what the Secretary said, we do have—first of all, let me agree with you and let me reiterate what I said in my statement, that the F-14 is key to gaining and maintaining air dominance so we can do the other things that we have to do from the sea.

The second part of that, though, is that we have adequate numbers of F-14s now. For example, today we have in our inventory 477 F-14s of three varieties, the A, the A-plus and the D. The requirement is 458, so we actually have F-14s in excess to the requirement.

Even without new procurement of F-14s, we will have sufficient F-14s to man all of our carrier decks, our training squadrons and pipeline until about 1996.

Mr. DYSON. Now it's my understanding that without the new production, how would the Navy counter the combined effects of the attrition, plus the end-of-life retirement, excuse me, in fiscal year 1989 and beyond? I understand today what the situation is, but we are talking about in those out years.

Admiral DUNN. Yes, sir, in the years beyond 1995 to 1996, we will begin experiencing increasing shortfalls in our F-14 inventory until by the year 2000 we will be short some 56 F-14s to the requirements.

We would hope that the Navy variant of the ATF would come in before that and then begin to fill in for those shortfalls.

Mr. DYSON. But hasn't that been slipping?

Admiral DUNN. The initial concept development was slipped by 1 year, which, of course, will delay the Navy IOC by a commensurate amount. We still expect to see that airplane coming into the fleet somewhere between 1999 and 2001.

Mr. DYSON. Let me ask you one other question then, Mr. Chairman, I would ask if I can submit some questions for Admiral Dunn on the EA-6B. If everything, as it were, say, 5-6 years ago when we were seeing enormous increases in spending in our national defense, would you at that point support that; given we had that kind of a budget situation today?

Admiral DUNN. Would I support the new manufacture of F-14D?

Mr. DYSON. Exactly.

Admiral DUNN. Absolutely, yes, sir.

Mr. DYSON. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Blaz.

Mr. BLAZ. Thank you, Mr. Chairman.

As you know, I don't have any defense industry in my district, so my questions will, of course, be very nonparochial, but they do have—thank you very much, sir, but it does deal with the V-22.

Before I ask the question, I recall Mr. Cheney saying that he thought highly of the aircraft, and they simply could not put it in the budget, but if he had any funds whatsoever, you would be the first one he would put back in.

Yet I was very sorry to hear you say that the reason it was cut out, according to your oral testimony, was because of cost and performance. It was my understanding, sir, that it was its performance, its potential, that made it so attractive in the first place.

I was wondering if you might want to elaborate on that because it is a little bit different from what I had heard.

Mr. PYATT. Well, the potential we all agreed on some time ago or it never would have gotten this far through so many battles and so many places. But again, it comes down to where we stand today and what are the budget priorities today and what are the alternatives for fulfilling the mission.

I believe it is that when people in OSD took a look at the various programs they concluded that in this particular case, the plan that could proceed and provide the Marines improved lift was basically a program that existed prior to embarking on the V-22.

I just noted here that the V-22 has some current problems in development, not unlike others, that have occurred. That was also part of the observation. I am sure if the program would have gone smoothly, we would have reached a decision a year ago, and it is much more difficult right now.

Mr. BLAZ. All right, sir. By the way, Mr. Chairman, the light was red when I started, sir.

The CHAIRMAN. Don't worry about it.

Mr. BLAZ. Let's just assume that if the V-22 were restored in the DOD budget, what would be a realistic approach, a simple restoration of the fiscal year 1990-1991 budget request or a restructured program?

Mr. PYATT. I think there would probably be some debate about that, how the best way to proceed would be. But I believe enough has happened there would be some kind of restructuring required.

If we are going to build this whole program, I think we would have to assure we have a competitive program. Contractors have been trying to avoid that, because you have got to control the costs; and the production cost projections have been increasing.

That is a worry to us, so it would have to be addressed. I think there would be restructuring required.

Mr. BLAZ. Let me shoot a second to the F-14, and again, my question is truly nonparochial this time, Mr. Chairman.

One of the problems that I have with it when I heard about it was that as I understand it's quite possible that because this F-14 were to be cut completely that it puts an industry, a very, very prominent one of long standing and great reputation, in jeopardy of actually being closed down.

Do you feel that way? Mr. Pyatt.

Mr. PYATT. Oh, yes. We have had the same problem in various other industries across the United States and had to face them from time to time, and it is also a tragedy. But again, we are where we are and have to make decisions that reflect on the defense program, on the Navy program, and we tried to put the best combination we could.

I know it is subject to debate.

Mr. BLAZ. All right.

General Pitman, by the way, welcome on your maiden trip to the Congress.

Over the past several years, Congress has appropriated funds each year for two KC-131 Tigers to modernize and expand the marine reserve tanker capability. My question to you, sir, is how is this program progressing?

General PITMAN. It is progressing very well. We have 18 aircraft either delivered or in procurement at the present time. We have equipped our squadron at Glenview with eight new KC-130Ts and at Stewart Air Base in New York with four.

Both squadrons are operating efficiently and the aircraft are being maintained very well. They are providing a lot of support to the Active Force, as well as our Reserve Force.

Mr. BLAZ. Finally, I would like to ask you—and this is going to be difficult, so I suppose I should preface my remark with the usual personal opinion type thing, but I will try to make it so that it won't put you in jeopardy.

General Pitman, how do you respond to concerns expressed by some that the mission of the V-22 is too narrow to justify the cost of the program? If you are uncomfortable with that question, I will submit it to you in writing and you can respond to it in writing.

General Pitman. No, sir. I can answer it now. It is not a narrow mission that this V-22 is to be viewed for. The ship-to-shore movement in itself is not a narrow mission. Moreover our marines don't intend to just go ashore. They will continue to fight once ashore, and are going to still need this aircraft's unique capability. In modern warfare, especially with the sophisticated weapons that our potential adversaries possess—not only the Soviet Union, but most any other Third World country—we will need the operational capability and survivability of the MV-22.

They also have helicopters that are armored and highly maneuverable; therefore we need to be able to outmaneuver them. Additionally, the Soviets have helicopters that can fly faster than ours are self-deployable and heavily armed. The V-22's unique capability, the first in the world, would allow our forces to move around their strong points and get to their weaker areas so that we can build up our forces faster and take charge of the battle as opposed to just being a participant.

We cannot afford—the United States cannot afford—attrition warfare any more. We found that out as a result of spending 10 years in Vietnam, which finally wore us down. I think that we have to look at how we are going to win a decisive victory early on. The V-22's capability, that no one else has, would be a great advantage to us and the rest of the free world.

It is not a narrow mission that we are addressing. Maybe the Marine Corps is viewed as having a narrow mission, but we don't see that either. We see these aircraft deploying with marines aboard to support the MPS ships.

The Congress has bought us three sets of MPS ships for worldwide contingency deployment to supply equipment to marines. We also have equipment stored in Norway for use by Marine forces. For our aviation combat element to support the ground combat element the aircraft must deploy somehow and they have got to get the helicopters there, either by C-5 or surface ships, if helicopters are to be used.

We have very few helicopters that can self-deploy across the Atlantic or across the Pacific. This aircraft provides us that capability. In all of those missions the V-22 is decisively a much better aircraft. It is expensive. We have looked at this along with what an alternative force would cost. Based on the information and the cost and all that the Secretary was given in the present budgetary constraints, we don't know what else he could have done. We understand that, but that doesn't narrow the mission of the Marine Corps nor the mission of this aircraft. It's a fantastic step forward—a quantum leap forward as people have said, and I believe that. I think it will prove itself.

Mr. Blaz. I see your views aren't too narrow, either.

General Pitman. No, sir.

Mr. Blaz. Thank you very much, Mr. Chairman. With your permission, I would like to submit some questions for the record later.

The Chairman. Without objection.

[The questions may be found at the end of the hearing].

The **Chairman**. Let me follow up the question and ask a little bit about the alternatives. Secretary Cheney mentioned that there were alternative ways of accomplishing the mission. In particular, what kind of alternatives are there? What would be the alternative way of doing it?

General **Pitman**. The alternative proposed that we use CH-53E, heavy-lift helicopter designed for logistics, for tactical troop lifts, as well as for logistics.

The alternative force would also include the UH-60 or the CH-60 which is be similar to the Army's Black Hawk, although not the same.

We had looked at this alternative many times in the past, and it was rejected each time based on cost and effectiveness studies. That is why we elected to go to tilt rotor technology; from our perspective there are other requirements associated with this alternative. To get the necessary aircraft to provide the same amount of lift, requires large numbers of extra aircraft. This entails more marines to fly them and, more pilots to be trained. All that was in the cost analysis, but unfortunately we were unable to make a convincing case to the Secretary as he faced his budgetary constraints.

But there is an alternative. It doesn't start until the out years, with the exception of the CH-53-E which would commence in fiscal year 1990.

The **Chairman**. Was there anything offsetting in this budget? They increased the buy of the CH-53-Es?

General **Pitman**. Yes, sir, 20 additional aircraft.

The **Chairman**. How many?

General **Pitman**. We were only getting three, sir, and we currently have 23 in this fiscal year 1990 budget and 23 more in 1991.

The **Chairman**. So they increased the buy of the CH-53-Es to try as the offsetting mission?

General **Pitman**. Yes, sir.

The **Chairman**. Thank you.

Mr. Ireland.

Mr. **Ireland**. Thank you, Mr. Chairman. If I could follow up just one or two questions for the General on the V-22. In the previous budget that included the V-22's, there obviously were some out year projections of cost which were of course laid aside when the V-22. Could you tell us what those out year costs were?

In other words, how much money is saved in the 5-year plan by scrapping the V-22 at this time?

General **Pitman**. Sir, the way the profile was laid out, the V-22 costs $8.8 billion, for the fiscal year 1990-1994 timeframe. The alternative mix costs $3.5 billion. So that the net short-term savings is $5.3 billion. It is over a 20 year life cycle and including operation and support costs that the V-22 saves over $5.5 billion compared to the alternatives.

Mr. **Ireland**. Over the 5-year plan, right.

The **Chairman**. To follow up, what was the total program cost of the V-22?

General **Pitman**. The total remaining program cost beginning in fiscal year 1990 is about $16 billion (Cy 88 $). That is from now until completion. That doesn't include the $2 billion that has already been sunk in R&D costs.

The **Chairman**. I think the selected acquisition report gives a bigger number. What have you got? The SAR says $27 billion.

Mr. **Pyatt**. I think that was all services. I don't recall exactly, but there was some at one time and for other services. Mr. Necessary has the document. What do we have here? Twenty-five billion for Navy?

The **Chairman**. Twenty-seven billion for all services; is that it? All services? Just about the same price as the Midget Man. A random observation of a program that is being attached because it is too expensive. We have here the V-22, which is about the same price.

Mr. **Ireland**. I understand that. I am letting all that settle down here. In the 5-year plan, as a diversionary action, the 5-year plan is $6 million; is that right?

Mr. **Pyatt**. It looks like about six.

Mr. **Ireland**. One further thing about the mission of the V-22 and I know I am behind on this, but in some of the discussions I have heard it's been stated that if we had this capability of the V-22 over the last 40 years, there would have been only, I believe it is quoted as one incidence when it actually would have been used.

I would have no way of being able to endorse or refute that argument, but I hear it out very frequently that we wouldn't have been using the thing if we had it, and I just ask what kind of a thought you have on that?

General **Pitman**. I believe the statement was that we haven't made an opposed landing since Inchon, 40 years ago. The fact is, we have made other opposed landings. It wasn't opposed like Inchon, but we did land at Grenada and during Vietnam.

This aircraft is not intended for only the ship-to-shore movement in an opposed landing. The marines have used helicopters around the world, in all kinds of conditions. We fought 10 years in Vietnam using helicopters that were a lot slower, a lot less capable, a lot less survivable, and we lost a lot of soldiers, marines and sailors in these helicopters.

The Mayaguez is another instance when using Air Force helicopters, the marines were left out on a limb. There, we lost some marines in the water due to the inability to get our forces where they should be in time. We had to put marines in Air Force helicopters then they couldn't communicate once they were in the water and on the ground.

The Iranian situation was one where the V-22 would have made a considerable difference on how we could have operated, so we don't just use these for opposed landings.

The Marines have been flying the CH-46 now for over 25 years all over the world in all kinds of crisis situations, not only in an opposed landing situation.

We only buy aircraft for the Marine assault forces about every 35 years, and we have been waiting 15 years, working on this program, trying to get the V-22 on the street. It's got a lot more survivability and safety built into it than anything today, and our Marines are going to be using this vehicle in combat and in harm's way out until the year 2025 and beyond.

Mr. **Ireland**. That is a good perspective. I don't want the one side of an argument just to be floating around there without hearing those other sides. I have only one further question, and that is about the F-14D operation.

I understand what it is doing but I hear comments about the F/A-18 and its relationship to the task at hand, and the F/A-18 doesn't have the legs, so to speak, doesn't have the range.

Do we have a problem them?

Admiral DUNN. A problem with the F/A-18?

Mr. IRELAND. Right.

Admiral DUNN. The F/A-18 is, with all due respect, is probably the best airplane the Navy has ever acquired for its mission. It is capable in a wide variety of air-to-air efforts. It is extremely capable in air-to-ground delivery of ordnance. It doesn't have as much range as we would like to see, but I don't think any aircraft has as much range as we would like to see or as much staying power.

It has proven to be an order of magnitude better than the F-4, which it replaced in the fighter role. It is as good as the A-7 in the attack role, better in terms of ordnance delivery accuracies.

We do have some ideas for increasing the fuel capacity, but it is not an official program as yet.

Mr. IRELAND. There is no trade-off here between the roles of the F-14 and the F/A-18?

Admiral DUNN. There is a trade-off in a sense if you consider that we have on the carrier deck three types of aircraft that we would call strike capable. We have the F-14D or the F-14 for fleet air defense, if you envision a spectrum, it is on one side of the spectrum. A very capable long endurance aircraft capable of firing a long range missile.

At the other end, we have the A-6, soon to be replaced by the A-12, for long range all weather strike. In the middle between those two we have the FA/18 Hornet. The Hornet can do some of the A-6 mission, but it cannot go completely long range all weather. It can do some of the F-14 mission, but it cannot fire this long range missile, nor can it stay on station as long as the F-14.

We need all three in today's environment for the foreseeable future, the next 10 to 15 years anyhow in order to have capability across the entire spectrum. So while they are complimentary to one another, they are not in competition with one another.

Mr. IRELAND. Very good. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mrs. Lloyd.

Mrs. LLOYD. Thank you very much, Mr. Chairman.

Mr. Pyatt, Admiral Dunn, and General Pitman, I welcome you to our hearing today. This is a very agonizing time as we do make decisions on procurement levels. Obviously, we cannot purchase all we would like to purchase, and it is rather agonizing. We have a great deal of accountability at this time to make what we consider to be the best decisions in the long run.

We look at our long range planning process and beyond the decisions just for meeting our budgetary commitments this year, and I would hope that we would give very careful consideration to the costs and numbers of the weapons systems that we move out of the R&D phase into the initial production phase.

This seems to be where we are having so many of our problems this year. But I am more concerned that we may be abandoning one of our most cost-effective means of procuring systems, which is our second source competition. It is my understanding that by second sourcing the Tomahawk that the Navy saved close to $29 million. Is this correct?

Mr. PYATT. We have, by our various second sourcing activities, we basically made the Navy affordable over the last several years and have been able to get some of the levels, Tomahawk has been one of our successful programs. There are several others, too.

Mrs. LLOYD. What is the status of our second sourcing programs in our budget this year?

Mr. PYATT. I am sorry, I didn't hear you.

Mrs. LLOYD. Are we having adequate levels of funding to allow us to dual source some of our competition?

Mr. PYATT. I think in the Navy budget, as I sit here and think about the ones in most trouble are the ordnance areas where we have had to carve down the numbers to where maintaining second sourcing is going to be a struggle, I would guess I would put it that way.

Mrs. LLOYD. I wanted to ask you about the Standard missile. It is my understanding that last year that we were able to purchase about 14 percent more by second source.

Mr. PYATT. That is right. We had two ship fills that we hadn't planned on having.

Mrs. LLOYD. Is this going to raise the cost of the missile and have an adequate buy by reducing the numbers this year?

Mr. PYATT. When we put together all these programs on ordnance second sourcing, we also put the volume up high enough to make a good head-to-head competition, and as you start getting down to some of these lower numbers, you get to think about how you put them together. It is going to be a struggle. That is one of the fallouts of the overall pressures.

Mrs. LLOYD. This allows us to second source this system? Will we be allowed to dual source this system?

Mr. PYATT. Yes, but just barely.

Mrs. LLOYD. Thank you very much.

Thank you, Mr. Chairman.

The CHAIRMAN. Let me just follow up a little bit on this. It seems to me that what we are talking about here is one or two weapons systems, but the really serious problem I am worried about is the general funding for the Navy aircraft account. We always worry about how we should not repeat the hollow forces of the late 1970s. I am afraid that in the Navy aircraft account, we are about to do just that, if we are not well along on doing just that. I was just looking at a few figures here. Looking at these numbers, we bought about 210 aircraft a year to support 12 deployable carriers in the 1970s? How many are we buying now, a hundred?

Mr. NECESSARY. We bought about 190 a year ago. We are down now to about a hundred aircraft, and we are supporting 14 carriers.

Mr. PYATT. Well, I am trying to recall this string of numbers, but it is important to compare the carrier aircraft, rather than the total number of aircraft. If you have done that with 210.

The CHAIRMAN. The carrier aircraft.

Mr. PYATT. OK. Well, then it is something that worries me, too, when we put this together.

The CHAIRMAN. Basically, the problem is we are just not buying enough carrier aircraft. If you look at the requirements to replace the aging and those lost to accidents, you should be buying about 325 planes a year. We are down to about a third of that.

Mr. PYATT. I don't think the number is quite that high. Fifteen hundred, 1800 carrier airplanes? You should buy them at a pace, I would say, to replace them on a 15-year cycle, so that would be what, 7 or 8 percent a year of that 1500, so 180, 200 airplanes. OK. We are close to it.

The CHAIRMAN. Anyway, we are not doing it. We are not buying the planes that would be necessary just to replace the ones we have to keep the process going. The age of the aircraft has gone up. In 1979 the average age of the aircraft was about 10 years, we are now up to 14 years. We are not buying the modifications and spares to support existing aircraft either. I think it is down by about two-thirds, the budget for that.

We are nowhere near buying enough aircraft to go with the Navy ships that we bought.

Mr. PYATT. That was one of the issues that we tried to get raised last year during the A-6 struggle. That is the airplane category that we most need to replace, and in the force level numbers, as you have seen, the one where we are the shortest.

So we somehow decided to take this interval of not buying attack airplanes, waiting for the A-12. I think that was a decision that both branches were involved in, and you can see some of the same things in other categories.

I think we also need to consider whether—I think I am the first guy who ever used average age some years ago to describe an Air Force or a Navy Air Force, and so I have to take some responsibility here. But our planes also get updated. They get updated structurally, and they get updated with combat systems.

We need to consider whether that simple measure that was invented 20 years ago is still an appropriate measure, and I am not sure it is with all the updating that goes on.

The CHAIRMAN. All I am saying, is that you can argue about individual statistics here. I think the general point which all of the statistics point to is valid, and that is we have a Navy sized in terms of ships, for which we are not funding sufficient aircraft to support that size Navy.

Mr. PYATT. I would like to see us buying more airplanes, again, like we were trying to buy A-6s last year. I think it is a good issue. That is another way to put it.

Mr. SISISKY. But you still have enough planes to keep your 13 groups in reserve; am I correct?

Mr. PYATT. That is correct. We have enough planes. One of the other things we have been doing is trying to move them through the Naval Air Reserve Facilities (NARF), so you have better use of the inventory pipeline; and several category of plans have come down over the last several years so we have better use.

So there are some other things that complicate it, but when you get to the bottom line measure that you just used in looking at the average age, yes, I believe we have a problem and one that we need to work on.

We have worked on it in some ways by service life extensions, by combat system improvements, but there is an end to that to what you can do. We do need to get back to buying airplanes, but right now, we are in a decade where we have two major developments going on in the A-12 and the NATF.

So we are kind of caught in between of how fast do you move along buying the airplanes that we know work in anticipation of what is coming on next. It is also a tough decision about exactly how to measure that.

The CHAIRMAN. It looks to me like we are setting up for a smaller fleet than 14 carriers.

Mr. PYATT. I don't think so. I think that what is there, we have the adequate inventory to provide airplanes on the decks, and Admiral Dunn may wish to add more, but——

Admiral DUNN. We do have adequate numbers of aircraft to man our air wings today. Even with the recent decisions remaining at 14 deployable carriers, we will continue to remain at 15 air wings, 13 active and two reserve, and for each category of aircraft, we do have enough.

This means that we have to exercise certain management techniques. For example, shifting aircraft from one air wing to another as an air wing deploys; and, of course, that uses up service life faster. We cannot continue to exist with the numbers of aircraft that are in this particular budget. We have to look forward to future years when we can somehow or other afford more carrier aircraft.

The CHAIRMAN. How are we going to get it? I don't see budgets getting any better in the out years. We are doing some of the things that I guess you would have to do in order to try and make cuts, which is cancel the V-22 and cancel some expensive programs. You have shortened the number of production lines. I think that is a smart thing to do. How is the Navy aircraft share of the budget going to get larger in the out years? I don't see it getting any bigger.

Admiral DUNN. I am not sure that the Navy, specifically, Naval aviation is going to get any bigger percentagewise. I think you hit upon some of the things we are going to do. With our program for necking down the different types of aircraft; and as we move toward fewer types of aircraft in the aviation inventory, particularly aboard our carrier decks, that will enable us to afford more and come back up more toward the inventory levels we require.

The CHAIRMAN. Check the numbers. My numbers say we are buying in this budget a hundred carrier aircraft. Mr. Pyatt says to keep the force you ought to be buying 200. My numbers show we ought to be buying about 300. In any case, we are not buying enough naval aircraft just to sustain the force, just to turn it over, just to keep it going, given the attrition of accidents and normal life cycle of aircraft.

How is that going to change? You are canceling the V-22 to try and save some money and you are trying to take steps that surpass life extension. I understand all of that, and these are nice figures if they were temporary and if somehow we were going to get better in the outyears. I don't see it getting better in the outyears. I see fewer aircraft carriers in the outyears. I see the thin end of the wedge coming at us. We are not buying the aircraft to keep up the carriers.

Admiral DUNN. The dilemma, Mr. Chairman, is we continue to have to meet obligations, treaty commitments, and demands of fleet Commanders-in-Chief, and we need a minimum of ships to do that. If we are going to continue to do that kind of thing and if we are going to populate the decks with adequate number of airplanes there is going to have to be some change in priorities and how we spend the money. That is above my pay grade.

The CHAIRMAN. Mr. Hansen.

Mr. HANSEN. Thank you, Mr. Chairman.

Admiral Dunn, recently we went on this Navy project, "Quick Look", and we were on the *Coral Sea* in the Atlantic. Extremely interesting. I was absolutely amazed at the awesome ability of those pilots. We met with these pilots who were flying the FA-18 and the A-6 and I was somewhat surprised because they made quite a thing out of the idea they would prefer flying more hours than they would prefer an increase in salary.

If you look at the proficiency of pilots, I am kind of concerned when they talk about the number of flying hours that they have in. It seems to me with the sophisticated equipment and what they are called upon to do, that if you don't have enough money in your budget you can have all the airplanes in the world and they are not worth very much if you don't have someone at the throttle that is proficient in what he is doing.

Do you feel this is accurate?

Admiral DUNN. Yes sir. I am a pilot. I would take that over an increase the pay as well. Any pilot worth his salt will feel that way. We fly airplanes because we like to fly. We want to fly as much as we possibly can. The fact is we have budgeted and the Congress has appropriated money will give us an average of 25 hours per pilot per month in tactical squadrons, the fighter and attack squadrons.

This 25 hours enough has proven to be sufficient to maintain our required readiness. With that level of funding we have been able to achieve new lows in accidents and I don't see us going to too much more, given the fiscal problems we have.

One of the difficulties with that 25 hours per month nominal funding is that it is just that, nominal. When a squadron, a ship, deploys to the Mediterranean, the Western Pacific, or wherever, aircrews fly much more on the order to maintain carrier landing proficiency and other reasons. When the squadrons and the air wings are preparing to deploy during the workups, they fly for more than 25 hours a month.

In order to balance the books and achieve an average over the year those who are not either deployed or working up, fly less. You will run into people who fly 4 hours a month, or 6 hours a month. The problem with that is when a pilot sits around a ready room doing paperwork, and not flying, he gets frustrated and his attention turns to places where he can fly as much as he wants, and even though the flying is not as challenging, he can fly and that place by and large is the airlines.

So, yes, if I could rise the flying hours so everybody got a minimum of 25 hours per month throughout the year, that would be much better than a pay raise, or flight pay increase for our aviators.

Mr. HANSEN. Your studies show 25 hours a month is proficient enough to keep these people ready, is that right?

Admiral DUNN. Yes sir.

Mr. HANSEN. If you had your druthers what would that be?

Admiral DUNN. It would be somewhat between 30 and 35 hours.

Mr. HANSEN. General Pitman, I keep hearing CH-53 discussion about a Dual Sling option. Could you explain what it is?

General PITMAN. Yes sir. Several years ago when we were developing the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) our heavy jeep which carries much of our assault weapons, such as the Dragon, TOW, Stinger, etc., we wanted to make it more mobile on the battlefield. Because it is a pretty large vehicle, it doesn't fit inside any of our current helicopters, or the V-22 for that matter. We were looking at a way to carry two HMMWV's at a time with a CH-53E. The aircraft has the capability, lift-wise to do that.

So, we actually tested it a couple of years ago, 2 hours of testing. While it is not fully tested, it did, in fact work. In an administrative situation you could lift vehicles that way. Our problem is that in tactical situations, such as ship-to-shore or even ashore in a combat situation, one usually doesn't want two HMMWVs in the same landing zone.

Second, once you position them on the deck for pick up, you can't move them. When you hook them together you can't drive them around. So wherever they are, they stay and they clutter up valuable deck space. Just as in carrier operations you discussed the LHA has a similar problem, it has to move aircraft on and off the deck very quickly, particularly in an assault situation. So these administrative lifts would get in the way and clog up the deck.

We are not against the Dual Sling idea—we thought it up. The most practical use of it would be for administrative movement of the vehicles, but certainly not during the initial assault waves.

Mr. HANSEN. Thank you very much.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you.

Mr. Rowland.

Mr. ROWLAND. Thank you, Mr. Chairman.

Admiral, a couple of quick questions. During Secretary Cheney's remarks on the budget, I saw that there was a decision to delay the procurement of the Seahawk Lamps MK III (SH-60B) helicopter. I had a briefing shortly after that decision to delay the procurement and I wanted to know why we were delaying it. I found there was some deficiencies and actually there were 4 previous years of procurement that most of the deficiencies were being addressed.

I would ask two questions:

One, In your opinion, do you feel that was a good action?

Two, in the briefing I found that the SH-60 helicopter has operated, for example, for 32 continuous hours and in one particular instance, flew 850 miles nonstop. The maintenance hours are, I think the ratio is less than six to one, which is considerably less than other helicopters that we compared with the SH-60. So I throw two questions at you.

One is, do you support that decision?

Two, with the tremendous capabilities of the SH-60 helicopter would the delay in procurement adversely impact the fleet?

Admiral DUNN. Yes sir. I support the decision. It was perhaps not a necessary decision because as you suggest, all of the corrections were underway. I have flown that particular aircraft. It is a quantum improvement over the aircraft it replaces—the SH-3 helicopter. It does everything that even the manufacturer claims it does and does it well, and we need it to replace the H-3 helicopter, which has been around for some 30 years.

The fact that it has been delayed 1 year, we will not procure the 12 aircraft we thought we were going to get in fiscal year 1990 in accordance with this budget, will not have a serious effect on official standup. The first aircraft are being delivered even now to our helicopter training squadron in San Diego and they will begin training next month.

However, what it will do is delay the achievement of a full operational capability throughout the fleet and that is going to cost us some extra money. We don't know exactly how much yet, but some extra money is in order to rework some of the H-3s that will have to say around longer.

Mr. ROWLAND. Mr. Secretary, the Landing Craft Air Cushion, (LCAC), the information we have on the committee indicates the LCAC is exceeding all operational and reliability standards, tremendous hours, on schedule, within budget, all those good things. Does it make sense to accelerate the procurement at this point in order to get them into the fleet sooner?

Obviously we have got a budget, but would it make sense to save money for the Government to procure them now, up front, get them into the fleet and actually save some dollars in the future?

Mr. PYATT. Last year the Congress appropriated 15, and we had asked for 9. I think this goes back to the question we had a little earlier on dual sources. It was a case where we had dual sources and we were able to put enough bargaining chips on the table to make it a good scrap.

The taxpayer benefited and I think in that process, we were able to get them a little less expensively and get the fleet equipped a little quicker, and all those are contributions to a modern Marine force.

Mr. ROWLAND. The fiscal year 1991 budget calls for 12 additional LCAC's. Would it be prudent to consider buying 12 a year?

Mr. PYATT. Well, We can make the program run efficiently on 12 a year.

Mr. ROWLAND. I just want to pose a question to you, General, with regard to your decision to add 20 CH-53's helicopters. One, will that address the current shortfall that we have in our heavy-lift capability regardless of how the V-22 issue plays out? Will we still need additional heavy-lift capability? Are they separate issues? Are they one and the same? Are they connected? In your opinion is the helicopter safe?

General PITMAN. Yes sir. We still have a heavy-lift requirement, regardless of the V-22—however it should come out. There was 23 CH-53E aircraft in the fiscal year 1990 budget request. Our heavy lift requirement, not addressing the alternative force, is for 191

CH-53E aircraft to maintain attrition out through the 20 year life of the aircraft. Counting the fiscal year 1990 procurement of 23 aircraft, we will have procured 125 aircraft.

Yes, we still have a shortfall.

Mr. ROWLAND. In your opinion, do you feel the helicopter is safe?

General PITMAN. We do. We had some problems initially with pilot induce oscillators, but those have been solved. The technical evaluation program is nearing completion. The data has not been fully analyzed yet, but is still being worked. We have gone through all the testing and believe we have got a handle on all the different aspects of the stability problem.

We incorporated a mechanical dampener on the collective and we now have a software change to the Flight Control Computer system going in as. That will reduce the opportunity for pilot induced oscillations.

We feel that this is an excellent aircraft—as a logistic heavy hauler, it is the best in the world.

Mr. ROWLAND. Thank you.

I would note you have reduced the number of fatalities over the years and I think that is a combination of hard work and contributions of all the services. I have some questions I want to submit for the record, Mr. Chairman.

[The questions may be found at the end of the hearing.]

The CHAIRMAN. Fine.

Norm Sisisky.

Mr. SISISKY. Thank you, Mr. Chairman.

Admiral Dunn, this will probably be your last meeting here. I would like to thank you for your service to your country. You have exemplified what every good naval officer and every good American should do and I am personally grateful and I am sure the committee is also.

Mr. Chairman, you raised a question that I think is really vital and it is something that this Congress and this administration is going to have to debate in the years to come.

You assume, because of the aging of aircraft and the numbers of aircraft that it would mean less aircraft carriers. That is a fairly good assumption. But it is amazing how two people can look at it differently. I look at it another way. I look at it as the opening of a debate on deployed forces versus deployable forces. We have 400,000 troops in Europe and peace is breaking out. I don't see any Navy people in Europe, they are mostly Army and Air Force.

I think the debate will come in the next few years, and it will probably be the most important debate this Congress and administration has to do—whether we cut deployed forces and deployable on an equal basis. You fell right into the trap of what we have been doing in recent years. You said, where are you going to get the money in the Navy budget? I ask the question, why does it have to be from the Navy budget if there is money out there that can be saved in other areas such as deployed forces?

I repeat, the debate is what we do with our forces, whether they are deployed or deployable. I have to think in the future that we are going to be talking more about deployable forces, and that is obviously where the fleet comes in. It is absolutely amazing to me to see one of our aircraft carriers, and if any of you have ever done so in a foreign port, it is just an unbelievable experiences to see one of these ships with their battle group in a foreign port. I live in the Hampton Roads area and I look at aircraft carriers all the time, but they just don't look the same when they are lined up in our ports as when they are lined up in foreign ports.

I would suggest, Mr. Chairman, that the Defense Policy Panel, may be the place to open this debate, which I believe is going to come.

Having said that, I do worry, Admiral Dunn, about our people. You raised the issue about our worldwide commitments and I think we certainly have them. I don't see them reduced to any great degree, particularly those that are done by treaty. With the 14 carriers and particularly one of them that will be tied up for 3½ years, I think Secretary Cheney was asked this question, do you see our people at sea for longer lengths of time, which will get us back into the problem of the seventies? Do you think you can still keep them deployed more than 6 months?

Admiral Dunn. I think that—first of all, the answer to that question is yes, but it has to be explained. Secretary Cheney, I understand, has made public announcements and certainly the CNO, Admiral Trost, and Admiral Watkins before him have committed themselves to certain limits on deployment, a maximum of 180 days away from home port and at least twice as much time at home port as on deployment.

If we stick to those personnel TEMPO and operating TEMPO goals, and we have 14 deployable aircraft carriers and no reduction of commitment, something has to give. The intent of the CNO that what will give is meeting the commitment. So that we will, from time to time, fail to sail an aircraft carrier to satisfy a commitment to NATO or a commitment to a fleet commander, or a unified commander, for some other mission. What actually develops remains to be seen.

Mr. Sisisky. Most of the questions on the F-14 really have been asked that I was going to ask. The only thing that really bothers me is that yesterday, Mr. Chairman, we were sitting in this room hearing testimony on high definition television and for the Department of Defense to pick up something like $300 million in cost for this program.

If you remember, Mr. Chairman, I reminded them we are going to have ship repair companies going out of business, tank companies going out of business, and here we are today talking about an aircraft manufacturer going out of business. So the financial pressure is the basis of the debate. I am concerned because the Navy has been very successful with the dual sourcing and I worry if the F-14D goes out, then we really are talking again of one manufacturer of naval aircraft, is that correct?

Mr. Pyatt. Yes. Two out of the A-12 will come to to two manufacturers—General Dynamics and McDonnell, but one of the long term suppliers, proven suppliers, will be very much damaged.

Mr. Sisisky. So I do worry about that, and it is something we have to look at.

One other thing. The T-45. Didn't we have a dual program with the Air Force? Aren't we supposed to develop a trainer with the Air Force?

Admiral **Dunn**. I don't believe so, no sir. The T-45 was purchased as a derivative of the British Hawk training aircraft and it is for Navy purposes. I might say it is available to the Air Fore if they are interested. We would enjoy seeing our costs come down but that is another subject.

Mr. **Sisisky**. So would we.

Thank you very much.

The **Chairman**. Mr. Bustamante.

Mr. **Bustamante**. Thank you, Mr. Chairman.

Let me follow up on the question that you asked, Mr. Chairman, in reference to the aircraft procurement.

Admiral Dunn, in your testimony you pointed out that the figures for fiscal year 1990, the aircraft procurement budget was decreased by $488 million, is that correct?

Mr. **Bustamante**. Then you look to 1991, the amended budget submission for 1992 that you expect to get $692 million increase in that budget. How do you arrive at those figures?

Admiral **Dunn**. I am going to have to study that just a minute.

Mr. **Bustamante**. It is on page 2 of your testimony. The reason I am concerned is because we keep hearing about the shortfall over the next 4 to 5 years of $150 billion in the defense budget and we keep talking about concerns about aircraft procurement, yet in this year's budget, in the fiscal year 1990 budget, we decreased and then we assume we are going to increase by almost $700 million in fiscal year 1991.

Admiral **Dunn**. Yes sir. I think that is reflected in the number of aircraft that we anticipate or we would hope to procure in 1991, whereas we are asking for 140 aircraft of all types and models in 1991. That is based on a projection by the Office of the Secretary of Defense as to what moneys we will have available for Naval aviation. That is how we come by those figures.

Mr. **Bustamante**. Under the worst case scenario, suppose the budget is frozen, zero growth for the Navy. What happens then? Do we just go into a further reduction in the number of aircraft that we get for the Navy?

Admiral **Dunn**. I am afraid that is right.

Mr. **Bustamante**. Mr. Chairman, this would really place them in a real bind. Looking at this budget, and at what is being reported on a daily basis, when you add the airline's pilot requirements to GAO's forecast of what is to come in the next 4 or 5 years as far as the defense budget goes. I am concerned about the manpower reductions and pilot retention. How many pilots are we loosing in this next budget.

Admiral **Dunn**. We won't lose any pilots, sir. Any of the manpower reductions will be taken from elsewhere in the Navy account.

Mr. **Bustamante**. OK. So if we were to take further more reductions, it would really impact some of the new weapons systems coming on line. What would happen if we reduce manpower with all those weapons systems on line, will they just be stockpiled or what happens? Will we not be able to use some of those new weapons systems?

Our testimony reads, "If further manpower reductions are mandated our capacity to bring new weapon systems on line effectively and to operate safety those presently assigned will be in question."

Admiral DUNN. Yes sir. What that means is not so much in the officer end, the pilots, it is our enlisted personnel. If we don't have the enlisted people necessary to maintain the new systems, the readiness will go down. It is as simple as that.

Mr. BUSTAMANTE. These are pretty expensive weapon systems.

Admiral DUNN. Yes sir. Although compensating to a certain extent is that the new weapons systems coming on line require less maintenance hours per flight hour or operating hour.

Mr. BUSTAMANTE. A real quick question in another area.

On minesweepers, how are we doing on those two programs? I know we have got one in Wisconsin and one in Georgia.

Mr. PYATT. After years of trouble there are three people building minesweepers. The program is finally coming along and we are getting them delivered. Three are delivered this summer I think, and the issues that have dogged us for so long, I think are behind us.

Thee other minesweeper class, smaller class, being built in Georgia out of fiberglass, the last wooden boats in the Navy are being built.

Mr. BUSTAMANTE. Is that the Italian one?

Mr. PYATT. It is a derivative of the Italian design. They spent about 10 years working on it and it is a very advanced design. The fabrication of the hull is complete, virtually complete, and they are beginning the outfitting. It is coming along very well—again, with its share of problems.

Mr. BUSTAMANTE. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. McCloskey.

Mr. MCCLOSKEY. Thank you, Mr. Chairman.

I would like to talk and ask a question of you primarily about the V-22 Osprey. I was particularly interested in the General's statements. General, I will run off some of your exact quotes:

Talking about the past, you have lost a lot of soldiers, sailors, and marines, on conventional helicopters. You pointed to the Iranian situation and you said the V-22 would have made a considerable difference. When you talk about its use to the year 2025 and beyond, is that not in keeping with the constantly repeated Marine Corps contention that Osprey is the most effective and least cost solution, or alternative for that mission?

At the same time, there is some national press stirring right now that in effect says the Osprey is a do or die situation for Mr. Cheney with the ultimate issue being control of the defense budget. For example, the lead editorial today in the New York Times says the Osprey, $20 billion development, will cost $35 million a plane and offer only marginal improvements over helicopters which are available for just $6 million each. The editorial goes on and on in effect it says it is a marginal system. It is not really worth the cost.

General, somehow I don't hear that from you in your previous statements. What I hear, if you want to take the conclusion from your previous statements, is that you think there is a good possibility that thousands of lives of our soldiers, sailors and airmen are going to be lost if we don't follow through with this decision.

It has been sold to the House Armed Services Committee as the absolute highest priority of the Marines. Can you talk some about the mission differentiation between the Osprey and these helicopters?

In my interpretation, Mr. Cheney, blithely said, we will just handle this budget crunch with helicopters. Somehow I don't think it is that simple, or all previous representatives to us have been in the form or guise of a boondoggle.

General PITMAN. Sir, with regard to the losses, first, yes, this aircraft not only has all the modern technology available to fly, see, and operate at night, but a lot of survivability features built into it that no helicopter has. A helicopter by design, first of all, is at the limit of what it can do based on the laws of physics. We were looking for something that could go faster and have other features such as greater survivability. For example, when you have an accident or hard landing, the transmission on a helicopter tends to go down through the cabin and raises a mayhem in the cabin or the cockpit. This is not so in a V-22. If you have a hard landing, or are shot down, the engines, transmission and fuel cells are on the wings and are designed to break off at that point and not come crashing through the cabin.

It has an anti-plow system built into it so it doesn't tuck under when it hits the water or when it hits land. It tends to plane out like a water ski. It has many other features such as fly by wire technology.

It will have back up systems that our other aircraft don't have and not as many vulnerable parts. It has a new higher pressure hydraulic system. It has redundant systems throughout. So again, it is all the modern features you would have in a modern fighter or anything else. That is what we are talking about in terms of survivability.

Marginal capability? Again, I am not trying to argue with the cost difference as presented by the Secretary of Defense. We are talking about the value of the aircraft. There is unquestionably much more than a marginal difference. There is only a marginal increase in capability if you buy any other helicopter. All helicopters are limited in speed. The Soviets have some that are slightly faster than some of ours, but in fact they are also limited by the laws of physics.

This aircraft will fly like an airplane so it can get up to 275-300 knots. It will fly higher and faster. It is quieter, and it goes more than twice as far as any of the proposed alternative helicopters.

Now, does that make it wrong? This is in fact the least costly—best bang for the buck as it were. It offers a lot of combat and tactical advantages, as well as safety features that we are going to need for the next 35 years of operation.

Now, that doesn't mean we disagree with their requirement to cut something in the defense budget and the things that the Secretary had to face. He looked at this, it just happened to be a bad time for the V-22 program. It was on track. It was slightly behind on its flight test. It has only flown nine flights, but it is flying. We have 10 years of prototype flying with NASA and with the Army, and with the Marine Corps and the Bell-Boeing team, so we have a lot of experience.

We have high confidence it could have been delivered on time, but it is going to be expensive. I disagree it is going to be $35 million a copy. Our figures show when you use 1988 or 1990 dollars, 1990 dollars, it runs about $22 million a copy. But if you put the features that you are going to need to survive in any aircraft, whether it is a helicopter or whatever it is, out in those outyears, it is going to cost you nearly the same, and it is going to take more of them to do the job, and is going to do it slower, with less survivability.

But on the other hand, we can't offer up a program that would pay for it and we have looked across all of the Navy, naval aviation, and we see nothing that can put the $6 billion back in the budget to make this thing happen.

Mr. McCloskey. If you had to pick what to cut out between the rail-based MX or the small mobile missile, or the V-22 Osprey, General, what would it be?

General Pitman. I don't think there is any question of that, sir, in my case.

Mr. McCloskey. I think you commented generally, but could you comment as to potential troop losses? I have a paraphrase on a report here that says associated with the increased aircraft attrition is an increase in loss of air crews and combat crews. During 6 months of sustained combat, marines would lose three to four times as many air crews in the H-60 helicopter rather than the V-22. Similar combat crews carried in these aircraft can be expected to not survive. Could you just comment briefly on the degradation of mission under the helicopter alternative?

General Pitman. Yes sir. That was a study done sometime ago by the Department of the Navy. It looked at the combat effectiveness of the V-22 aircraft. It determined that the V-22 is more survivable, and has more redundant systems, whether compared with that of the CH-53E or the H-60D.The CH-53E is the free world's finest heavy lift helicopter, but again, it was not designed as a troop assault helicopter. You compare all those numbers and that is what it tells us over a 6 month period of combat.

Mr. McCloskey. So, could you not in effect, or substance, say that without the V-22 your confidence in your mission capacity here has been severely degraded for one of the most serious combat challenges facing the Marine Corps.

General Pitman. Absolutely.

Mr. McCloskey. Thank you, General.

The Chairman. Let me just follow up on some questions Frank McCloskey was asking.

What is the status of the program right now? I don't know whether I am asking Mr. Pyatt or General Pitman or whom. How much cost growth have we got in the program, and what is the delay?

Mr. Pyatt. Could I ask Commander of Naval Air Systems to speak?

The Chairman. Sure.

Admiral Wilkinson. Vice Admiral Wilkinson. The contractor right now is about 9 months behind schedule. He has accrued more costs than we have paid, but we have so far paid him all the money we owe him in fiscal year 1989. We owe him additional money starting the first of October of this year.

The initial flight test, about 2.3 hours, was quite successful. The aircraft performed very well, had good handling qualities, and flew a lot for the first phase. We expect to get back into flight tests, if the contractor continues, sometime this month; and hopefully we will then get into the position where we can fly it as an aircraft as well as a helicopter. It is being prepared for that right now.

The CHAIRMAN. What is the cause of the delay in the program. What is the hangup?

Admiral WILKINSON. The delays were primarily in integrating all of the systems into the air vehicle. There were no major technical or technology problems. It was just getting all of this stuff to work together.

They also had a problem with some of the test stands to test the transmission. That delayed them a little bit. They had some problems with the prop rotor grips—a part of the rotor system that was made out of composite material. There were delaminations in that material. But that is pretty well resolved now.

The CHAIRMAN. And the program cost?

Admiral WILKINSON. The program costs really haven't gone up as of now. We are still holding to the fixed price of the contractor development. The problem that we are hearing on costs right now are that the contractor has spent more money than he had planned to spend—at this point in the program.

The CHAIRMAN. That is another question I wanted to ask. Let's stick with this. Again, I am looking at the Selected Acquisition Report (SARS) here. These SARS are sometimes, and sometimes not, worth the paper they are printed on, partly because you guys keep hiding them. Anyway, the program acquisition unit cost has gone from—according to this December 31, 1988 SAR, gone from a unit cost of $32.3 to $38, really $39 million a copy, which is what percentage increase? That is about a 20 percent increase.

General PITMAN. Sir, I might try that. In our dealings with the program manager, I talked about that specifically. The cost went up because the Army backed out of the program, reducing the number by 231 aircraft and the Air Force reduced their buy from 80 to 55. That was one price increase.

The other was the stretch out of the program. When we were going to buy 132 per year program, the price was a lot lower and went up considerably when we slipped down to a maximum of 77 a year.

Mr. SISISKY. How about the commercial application, General?

General PITMAN. Certainly that is not in the SAR. It is in our minds, and we know that the previous director of the FAA was interested in its commercial applications. But, that doesn't enter into our cost figures.

The CHAIRMAN. General Pitman, you are saying the total cost growth here is attributed to the lower buy, the fact the Army is not in the program, and the stretch-out.

General PITMAN. Yes sir.

The CHAIRMAN. There is no cost growth due to developmental costs? It seems unlikely you have got a 9 month delay and no program cost due to technical reasons.

Admiral WILKINSON. If I may, sir. I think yes, the contractor is going to incur more costs, but this program was budgeted to the ceiling for the fixed price incentive contracts. So if the program had continued, we should not owe him additional development funds. Under the circumstances——

The CHAIRMAN. You are carrying it as a constant cost because you are figuring that Bell-Boeing is going to pick up the cost overrun? Is that how it is working?

Admiral WILKINSON. Yes. Right now our estimates are that he will go to ceiling. I think his estimates are that he will probably go a little over ceiling.

The CHAIRMAN. But from your standpoint, the cost is still constant because you are anticipating being able to hold Bell-Boeing, to its contract. Is that what you are saying?

Admiral WILKINSON. The development contract, if we could, yes. I think we could finish it at just about what we had originally in the budget.

The CHAIRMAN. Could you tell me what is the status? We had that letter that came around by Bell-Boeing that they were going to run out of money and quit the program on the 5th of May. Several other members have kind of referred to it. If you could tell us the status of that whole situation?

Admiral WILKINSON. Yes sir. They have been to see us. As I mentioned, their problem is with their termination liability, not their actual cash outlay. They now exceed the amount of money we have given them to complete this year. So, seeing the demise of the program, they don't want to spend any more money to increase that liability.

They have since decided to continue work. I don't know for how long, or whether they are going to reduce the scope of the work, but they have not stopped.

Mr. SISISKY. Mr. Chairman, who owns the technical data package on that aircraft? Does the United States Government own it or does the manufacturer? Could he use it for commercial application now?

Admiral WILKINSON. The Government paid for the development, so the Government, will own the data package.

The CHAIRMAN. So to get back to the question, as of now, they have let the date of May 5th slip, but you don't know whether that is—they plan to continue to September 30th or not? Is that what you are saying?

Admiral WILKINSON. I do not know that, sir.

The CHAIRMAN. Thank you.

Mr. Spratt.

Mr. SPRATT. Thank you, Mr. Chairman.

I would like for you to walk me through the F-14 decision, if you would, please. I have been reading the SAR here and the SAR is dated and difficult to understand anyway. I don't come from Long Island. I don't think I have any connections anywhere with the program.

The CHAIRMAN. Mr. Spratt, you and I are the only guys that read the SARs, these guys never read them. Don't ask them a question on the SARs.

Mr. PYATT. I appreciate that, sir.

Mr. SPRATT. What is taken out of the budget this year for the F-14? Is it $365 million only?

Mr. PYATT. Yes.

Mr. SPRATT. How much is left in once the $365 million is backed out?

Mr. PYATT. $771.3 million.

Mr. SPRATT. $771.3 million. What does that cover? What sort of reserve or termination liability is included in that?

Mr. PYATT. Admiral Wilkinson has more of those numbers.

Admiral WILKINSON. About $170 million of that is for closing down the F-14 production line including termination liability.

Mr. SPRATT. So there is a production line set up already as a result of the development work contract and the ongoing procurement contract.

Admiral WILKINSON. Yes sir. Of course, most of the F-14 structure is identical, the F-14 A and D structure is identical. So the total F-14 production line is being shut down.

Mr. SPRATT. That production line would lend itself to a remanufacturing operation?

Admiral WILKINSON. Parts of it. Those that do will stay in place of Grumman.

Mr. SPRATT. You have four stations in it obviously.

Admiral WILKINSON. Yes. But the parts that build wings and fuselages and that sort of thing would be shut down.

Mr. SPRATT. Is there any liability left under the development contract for the F-14D?

Admiral WILKINSON. That should have been fully funded, including a final payment in fiscal year 1990.

Mr. SPRATT. It was $1,044,000, according to the SAR. So there is no liability left there. The termination liability would be under the production contract for seven F-14Ds?

Admiral WILKINSON. We are not terminating any contract.

Mr. SPRATT. You are not terminating any contract?

Admiral WILKINSON. All we are doing is not completing the fiscal year 1990 procurement. The fiscal year 1989 procurement of F-14Ds will continue to its completion.

Mr. SPRATT. So you will complete the buy of F-14Ds under the procurement or production contracts already awarded to Grumman but you won't award any new contracts. Nevertheless, we still have a termination liability?

Admiral WILKINSON. Yes, as well as, line shut-down cost. It is the cost of dismantling the production line and either storing or doing something else with that equipment.

Mr. SPRATT. What is the program acquisition, unit cost of an F-14D re-manufacture compared to a newly manufactured F-14? What does it cost to run? What do you expect it will cost per airplane to run an F-14A through the line and have it come out an F-14D?

Admiral WILKINSON. I think a better measure would be the recurring flyaway between the two aircraft, because most of the support has to be there in either case. But for a re-manufactured F-14D, it is $26.9 million average recurring flyaway cost in then year dollars, and had we continued the 127 new aircraft program, they would have an average cost of $49.4 million for recurring flyaway.

Mr. **Spratt**. That would be $49.4 million which would assume what annual rate of acquisition?

Admiral **Wilkinson**. Twelve a year.

Mr. **Spratt**. Twelve a year. If that rate is increased to 18 a year does the acquisition cost come down to less than $40 million?

Admiral **Wilkinson**. I would have to provide that for the record. It would certainly come down. (See answer below).

[The following information was received for the record:]

The average recurring unit fly away cost at a rate of 18 per year for new production F-14D aircraft when combined with the current remanufactured program is estimated to be $46.8 million.

Mr. **Spratt**. When you figure the recurring flyaway for the F-14D that does not include the $170 million for line shutdown?

Admiral **Wilkinson**. It does not.

Mr. **Spratt**. If you lead that on to the additional units of 304 to be bought, that is just $500,000 a copy.

Admiral **Wilkinson**. There are 400 re-manufactured aircraft.

Mr. **Spratt**. You were going to buy 527. You back out 127 new airplanes and end up with 400 manufactured airplanes. What is the annual acquisition rate of those?

Admiral **Wilkinson**. That starts with six in fiscal year 1990, 12 in 1991, 24 in 1992, 48 in 1993, 60 in 1994.

Mr. **Spratt**. So it builds up considerably over time, then?

Admiral **Wilkinson**. Yes sir. I think about 60 a year it would be the recurring rate after that, funds permitting.

Mr. **Spratt**. That would assume about a $1.8 billion for 60; $30 million an airplane?

Admiral **Wilkinson**. Yes, $1.6 billion recurring flyaway for 60 aircraft.

Mr. **Spratt**. Recurring flyaway. That is everything, engines, avionics. The flyaway airplane includes the GEF-111D-400 engines?

Admiral **Wilkinson**. Yes sir.

Mr. **Spratt**. There is some question about nonrecurring development costs and whether or not these costs have been fully loaded onto the F-14D rework airplane. Have you fully included in the $26 million all of the nonrecurring development costs that have to be incurred in order to, for example, if you shut down the Grumman line, the manufacturing line, and go elsewhere, do you have startup costs that have to be loaded on to the F-14D?

Admiral **Wilkinson**. The figures I gave you, the recurring flyaway, do not include any of the nonrecurring. Now, if we do move it to another site for remanufacture there would be some startup costs. That would be included in the competitive program and that would have to be less expensive, if we do that, that would have to be included in the cost, the cost analysis in competing the two sites.

Mr. **Spratt**. Does that mean if you do complete the F-14D, the reworked F-14D with your air work facilities, if Grumman has to compete to take that away from in-house facilities or to win that work, that Grumman would have a competitive advantage because it already has a line set up?

Admiral **Wilkinson**. They might.

Mr. **Spratt**. Is it considerable?

Admiral WILKINSON. I don't know. It depends on what Grumman does. With Grumman losing production, they are going to have to down-scope their operations considerably. They would have to decide whether they are going to continue to do the re-manufacture program at Long Island or maybe do it at another site, where they might be able to do it for less cost.

Mr. SPRATT. What is the service life left in F–14A, an average F–14, after it has been reworked into a deconfiguration?

Admiral WILKINSON. Right now it is about 3,000 remaining hours, with the potential for another 1500 hours based on some successful fatigue tests now completed. That is about a 10 to 12 years more life.

Mr. SPRATT. For a new F–14D, what is the service life expectation?

Admiral WILKINSON. About 7500 ours right now.

Mr. SPRATT. So a reworked F–14D has about half the service life of a new F–14D?

Admiral WILKINSON. Something like that, yes sir.

Mr. SPRATT. So it would be less than half the cost, so it is a close call.

Admiral WILKINSON. It is a close call except the remanufacture program phases in nicely with the naval advanced tactical fighter program. We probably would not need all new aircraft. So it would be cost effective, providing we have a new fighter airplane coming when those older F–14Ds, finally run out of life.

Mr. SPRATT. You are really backing out more than 127 airplanes. If you wanted your inventory according to remaining service life, the ones you are backing out have twice as much service life as the ones you are keeping and reworking?

Admiral WILKINSON. That is correct.

Mr. SPRATT. So it is not a linear production there. We have heard it stated that you already have, or you will have with this number of airplanes, adequate F–14s to deploy on a 14 carrier battle group basis, is that correct? Are you undercutting your force by any number if you don't buy these 127 additional planes? Is there some case here where you can't meet your commitment if you don't have these F–14s on carrier decks?

Admiral DUNN. No sir. We will continue to meet our commitment and we are planning for 15 air wings worth of F–14s with 20 F–14s per air wing, 13 Active and two Reserve air wings.

Mr. SPRATT. That is not degraded by this decision?

Admiral DUNN. No sir. Until 1995 we will have enough F–14s of the three different varieties—the A, A plus, and the D—to populate our Active squadrons, Reserve squadrons, training squadrons and the R&D and pipeline.

Beginning in 1995, however, we will face, without new manufacture, increasing shortfalls in F–14 aircraft. Those shortfalls will start at nine below requirements in 1995, and be at 56 below requirement in the year 2000. This shortfall can be handled in a combination of ways.

One is, as we do with the A–6 even now, is to cross deck between air wings as they deploy and in the event of a major war, we would draw aircraft out of training squadrons and pipelines in order to fully equip the carrier decks.

The second thing we want to do is to participate fully in the development of a Navy variant of the ATF and we would hope the ATF would begin coming on line in numbers before we got into an emergency situation with the F-14 inventory.

Mr. SPRATT. What happens to the rest of Grumman's production if the F-14D, the reworked F-14D, goes to your rework facilities and doesn't stay at Grumman? What do you do about A-2Cs and the old electronic tactical warfare capability that Grumman represents? Can they continue to manufacture them with the overhead that would have to be loaded on to the small unit purchases?

Admiral WILKINSON. We have not considered it with the remanufacture of the F-14D leaving Grumman. I think that probably some part of that would continue at Grumman. You would probably have two sites for it. But assuming that some F-14D remanufacture continues, Grumman thinks that with the reorganization, rescoping of the company, they can build E-2s with the multiyear program we have currently planned for fiscal year 1991 and out. They don't know where they will do that, but they think they can handle it.

The problem is in the near term, in fiscal year 1990. We think that the E-2C price will go up. We are not sure how much. Grumman will tell you $8 million a copy. Our people will say something less. But we are not sure yet. It really depends on how fast Grumman scopes down.

The EA-6B advanced capability remanufacture program that starts in fiscal year 1991 would also increase in cost. Again, we are not sure how much yet, that one might have to be done at another site.

Mr. SPRATT. As you bring all of these things together, the cost of stopping the old line, the potential cost of starting up a new line should Grumman not get the rework, the additional cost of E-2Cs and EA-6Bs modification work, the cost of the remanufacture plane goes up, approaches $30 million a unit, it seems to me.

Again, it is a close call. You begin to ask yourselves whether or not it would be advantageous to build the F-14D. What does that do for Grumman, building the F-14D in terms of spreading overhead and maintaining the industrial base there, as opposed to their having just the rework contract?

Admiral WILKINSON. If they had the new production they would be in pretty good shape because there are a lot of people associated with actually building up the pieces of that airframe. That would cover their overhead with a business base that would support them quite well for the programs that are now in the budget and they should be able to execute those programs within the dollars that we budgeted.

Mr. SPRATT. I am sure Mr. Hochbrueckner has more questions in store for you so I will leave that subject. Thank you for your answers.

The CHAIRMAN. Richard Ray.

Mr. RAY. Mr. Chairman, thank you.

Mr. Secretary, Admiral Dunn, if I could just speak briefly about a readiness issue, a readiness concern. As I understand it, all Navy heavy airlift capability is provided by about 27 Naval Air Force Reserve C-9 aircraft.

It is my understanding also the C–9, while a very good aircraft, is restricted in its capacity to carry critical outsized type cargo items such as F–18 engines, some helicopter blades, large ship repair parts, because they can't get it into the C–9. If that is the case, how do you handle those items that you cannot handle by C–9?

Admiral DUNN. We contract with commercial carrier or with Military Air Command (MAC).

Mr. RAY. I see. I understand also you have got seven C–130 aircraft in the Active Navy inventory that will handle that. Do you use those to some degree?

Admiral DUNN. They are forward deployed. They are overseas.

Mr. RAY. I see. It is my understanding that some consideration has been given to buying some more C–130s to use for that shortfall there that you have?

Admiral DUNN. Yes sir. There is a consideration. In fact, there is an airlift study which was conducted for us by the Center for Naval Analysis, which recommended we get some C–130s. Unfortunately, they didn't stack up with our affordability problems.

Mr. RAY. Did they recommend how many you needed in that study?

Admiral DUNN. I can't recall, sir. I will have to provide that.

Mr. RAY. So you don't have any additional C–130 aircraft included in the fiscal year 1990 budget?

Admiral DUNN. That's correct.

Mr. RAY. That is a budget problem?

Admiral DUNN. Yes, sir.

Mr. RAY. Would the acquisition of any additional C–130 aircraft increase the Naval Air Reserve Force capability to respond to fleet needs in the event that you have a serious situation?

Admiral DUNN. Yes, sir.

Mr. RAY. So you would say that the C–130 would be a good aircraft if you could afford it?

Admiral DUNN. Yes, sir, if we could afford it. Mr. Ray, the Center for Naval Analysis study specified or called for an additional 29 C–130s.

Mr. RAY. I see. Well, thank you, Admiral.

The CHAIRMAN. Mr. Kasich.

Mr. KASICH. Thank you, Mr. Chairman. Let me ask you a question because you are involved in contracting, and that means you have to have money in order to make contracts.

Mr. PYATT. It helps.

Mr. KASICH. For the last 4 years, or is it 5 years, we have been cutting this defense budget, haven't we?

Mr. PYATT. Yes, sir.

Mr. KASICH. How is it that members think that we can cut the defense budget 4 or 5 years in a row and have negative growth and not have that translated into the elimination of certain programs? Explain to me how you contract with declining resources.

Doesn't that mean that at some point you can't buy more when you don't have anymore money?

Mr. PYATT. It kind of works out that way, but it always seems that the cuts occur in somebody else's backyard, and so therefore it is okay to support cuts, but as we can see, they occur in a lot of different places, and clearly if you don't have money you can't write a contract.

If you do, some contracting officers are going to jail.

Mr. KASICH. What blows my mind about this hearing today is I see a number of people in this room from the military, from the Pentagon, and you are all in here today to tell us where you want to cut.

I was curious about General Pitman's response to Mr. McCloskey over here on the rail garrison MX. Maybe there are a couple of other Marine programs we can cut and have more rail garrison MX. I am not sure if the General makes budgets, but what I really want you to explain is when you cut the budget year after year after year there are consequences to those actions, aren't there?

Mr. PYATT. Absolutely. Programs that we have put together and like the examples this morning put together over a period of time, presented up here in good faith and under an assumption of a defense program, long-term defense program, when you make a cut something has to go, and we have made those proposals.

Mr. KASICH. Right. So Mr. Cheney puts together a budget to meet the resource amounts that are available, and he says that if we only have these many dollars, these are the programs that have to be cut, so where we essentially are today is we have the Pentagon up here on Capitol Hill arguing in favor of eliminating certain programs, and you are being faced with a task of arguing against a Congress that wants you to spend more for all these different programs. Isn't that where we are now?

The Congress is telling you to spend more. You are saying you want to spend less.

Mr. PYATT. Well, we are trying to implement an overall budget decision made pursuant to Gramm-Rudman, and we don't like it. We have had a lot of debates internally about what to do. It has been tough on us. A lot of people who are friends in the morning are not friends in the afternoon, and so it has been a very tough situation, and I think that people need to recognize that, that when they make cuts in defense there are results from it. Jobs are lost, procurements are slowed down or cut out completely as we talked about this morning, and there is no way to escape it.

We can go out in the contracting world and I can squeeze 5, 10, 15 percent out of the contractors and they come to you and complain, but that is all. I can't generate programs out of nothing.

Mr. KASHICH. They don't go to me to complain, but they go some place else to complain.

Mr. PYATT. I get a lot of word on the hill that Pyatt's being too tough on contractors. That is the only way to keep these programs together. That is the best we can do. We can't generate them out of nothing.

If the Congress doesn't authorize and appropriate the money, there is no chance of following through.

Mr. KASICH. When Members of Congress vote to cut the defense budget, what is the consequence of that in human terms? For example, just presume for a second that somebody from Long Island was watching us here today. What would the consequences be of Members who consistently vote to cut the defense budget? What does that mean to people, theoretically, to people on Long Island?

Mr. PYATT. Well, the people on Long Island who may be working on those programs that are cut out will have to find other firms of employment. It is unfortunate because they are very skilled people.

Mr. KASICH. So in other words, we don't have billions and billions of dollars laying on the floor of the pentagon that we can just scoop up and save? I mean it really means that you have to actually cut something, and it could ultimately mean somebody's job?

Mr. PYATT. I have spent the last several years squeezing every place I know to squeeze. Some people think we have done too much. There is nothing left.

Mr. KASICH. I don't prejudge people from Long Island who want to fight for their program. Maybe that is not the one that gets cut, I don't know.

Mr. PYATT I said earlier on——

Mr. KASICH. Something has to go, right?

Mr. PYATT Something has to go. We are making a series of proposals to the Congress. As I mentioned in my opening remarks, some of these will undoubtedly be debated, and that's fine, but in the end something has to go. We have less resources now than we planned on a year ago.

Mr. KASICH. What if we just stretch everything out and buy fewer of everything, instead of buying 50 planes, we buy 30. Isn't that an answer?

Mr. PYATT That happened during the 1970's, and it was a management disaster.

Mr. KASICH. So let me ask you one last question. What we are essentially saying is that Mr. Cheney's proposed cuts and their final enactment, what stands between Cheney's approach—when Weinberger was Secretary of Defense, he would come up here and we would be so angry at him because he wouldn't tell us what his priorities were.

Now we are mad at Cheney because he tells us what his priorities are. So here we have got a guy like Cheney saying I want to make cuts. Now what stands between Cheney's proposed cuts and their enactment is the Congress of the United States, isn't it?

Mr. PYATT Yes, sir.

Mr. KASICH. It is the same Congress that every year wants to cut more out of defense?

Mr. PYATT I think so.

Mr. KASICH. Then they don't want to have any consequences for their actions.

Mr. PYATT Not in their home district.

Mr. KASICH. Thank you, Mr. Chairman.

The CHAIRMAN. I would like to thank the gentlemen. I want you to know that as a footnote not everybody is mad at Mr. Cheney. Mr. Hochbrueckner.

Mr. HOCHBRUECKNER. Now that he has warmed up the crowd for me, right? Thank you, Mr. Chairman. I appreciate your allowing me to ask questions since I am not a member of this particular subcommittee, but a member of the full House Armed Services Committee.

Gentlemen, we understand that you are here today and you have to present the administration position, and so, we are going to avoid brow-beating and that kind of thing, but let me just say this:

Although I do have a question at the end, it is very clear that the Navy is heading for a shortage of aircraft. I don't think there is any doubt of that.

Regardless of what air wing configurations you impose, we are going to be short of aircraft. If we look at the five major aircraft that you have on the carriers, certainly McDonnell-Douglas' FA-18 is a good aircraft for what it was designed to do. The budget has 66 of those in there for this year.

The A-6, we are already short of A-6 aircraft right now, and that situation is only going to get worse. Admiral Crowe was in here 2 weeks ago, and in his written statement indicated that the ATA would slip, so the A-6 shortage we have right now will further be exacerbated by the slip of ATA.

Certainly EA-6B, the electronic countermeasures aircraft on the carrier that Grumman also builds, we are short of those right now, and there is no follow-on aircraft to that in the future. You have talked about an Advanced Tactical Support Aircraft, but we haven't seen anything at all for the ATSA.

Certainly with the E-2C, there is money in the budget this year for four of those, but here again there is no replacement for an E-2C other than the E-2-SA which we haven't heard anything about. Grumman builds that.

Congressman Spratt has well presented the problem with the F-14D. The issue is, of course, a shortage. Now last week Admiral Trost and also, of course, Secretary Garret spoke before the Seapower Committee. They agreed that in the 1996-1997 time frame we will start to be short of aircraft.

Admiral, today you folks admitted that from your point of view, between 1995-1996 we will be short of F-14's. Now we know the original program of the Navy which certainly made sense was essentially part of President Reagan's budget presentation this year, included converting 400A model F-14's to D models, recognizing, of course, that many of those air frames have a lot of hours on them already. But we will accept that.

Four hundred modified A's to D's, then you would buy 127 new D's over the next 10 years. As you know, 19 of those are in the pipeline, so if the plan that Mr. Cheney came in with goes through, we will end up with 400 A to D's and 19 new D's, and that is it. Now any way you cut it, we are going to be short of F-14's.

Certainly the follow-on aircraft to the F-14 is the Navy version of the ATF. There is certainly no reason, and I have worked in the aerospace business for 25 years, there is no reason to believe that the Navy ATF is going to be advanced. If it were on time we would be short in excess of 100 aircraft. If it were on time. There is no reason to believe it is not going to slip, as the ATA is already slipping. So the bottom line is that we are going to be very short of aircraft, so if we are short of A-6's now and we are short of EA-6B's now and we all agree that we are short of F-14's come 1985-1996, until the replacement comes along, we then must ask where are we going?

Now, if you look at the big picture, there is money for 66 F-18's in the budget. That is fine. It is a good aircraft. There is no money for A-6's and we are short money for the EA-6B. There is no money for new F–14D's, and clearly we agree we are going to be short, and there is money for four E–2C's.

Let me assure you gentlemen that if that budget goes through as it is written right now, Grumman is out of the aircraft design engineering and manufacturing business, and we have killed a company that has served this Nation proudly for over 50 years, and worse than that, you have limited the field of carrier aircraft competitors to one, McDonnell-Douglas.

Now you talk about Lockheed's S–3, but that line has been shut down. McDonnell-Douglas will be the only carrier aircraft manufacturer left in this business. Mr. Pyatt, clearly when it is good-bye competition, up go the prices. So make no mistake about it, this budget kills Grumman as an aircraft manufacturing company.

Because remanufacture has very little to do with having a prime production line in place, and designing the next level of aircraft, who is going to compete on the Navy ATF if you drive Grumman out of business with this budget? If you look at the budget, Mr. Cheney's budget, he came back in with, as you pointed out earlier, there was originally under President Reagan's budget $1.138 billion, which would buy 12 new F–14D's and convert the first 6–A's to D's. The present budget which is $771 million has termination money, as was pointed out for the D line, and also has the money to allow the conversion of the first six A's to D's. The point is that for $365 million of new money in this year's budget, above and beyond what Mr. Cheney has already prepared to put in, you can have 12 new F–14's.

Now, certainly I am not going to claim that you can buy an F–14D for $30 million a copy. That is just as absurd as the claim originally that the reason the F–14D would be killed is because they cost $75 million a copy. I think we agree the number is more like $49 million a copy if you bought a dozen of them a year, and certainly if you bought 36 of them a year, as the budget requires of F–15, and they go for $36 million a copy—you could have them for $40 million a copy, if you wanted to buy 36 and alleviate the shortfall that is coming.

That is the situation we find ourselves in right now, and so from my point of view I wish you gentlemen had been around talking to Mr. Cheney and whispering $49.4 million in his ear when someone else was whispering $75 million a copy in his ear because that bad advice is going to put Grumman out of business if this Congress doesn't turn it around.

So the only question I would have, and as I say, you have to present the administration line, I understand that, and you have to defend it, even though you may in your gut totally disagree with it. But there is no question naval aviation is in a shambles, those aircraft carriers. If we add the new ones, Mr. Sisisky, we are not going to have the planes to put them on.

I certainly want to see those aircraft carriers, but they are not going to be very useful if we don't have the aircraft and if the five major aircraft—we are even going to be short of FA–18's based on the present schedule. The other major five aircraft, the total five aircraft, we are going to be short of all of them going into the next century, so I guess my only question, Admiral Dunn, would be for you.

You have served the Navy extraordinarily well in the years that you have been here. You are leaving shortly. We appreciate that, and I just would like as someone who really knows the inside story, ask if there is anything, any comment you would like to make about the A-6, A-6E shortage, the impending F-14 shortage. Do you have any last comments for this committee in terms of department swan song relative to the condition that we are in and what would you do if you had a magic wand?

Admiral DUNN. Well, of course if I had a magic wand, I would make some more money available so we could get all those things we need. But that is obviously not in the cards. I think what has to be done is something that Mr. Sisisky suggested and others have suggested. We have really got to take a look at where we are in this overall defense business.

I will be accused of being parochial, but it is the Navy that is out there forward deployed. It is the Navy with its carrier battle groups. It is the Navy on station supporting the allies, ready to respond to any sort of crisis, whether it be some sort of limited retaliation or presence or even a full scale war, and the Navy just doesn't have enough percentage of the budget in order to do everything the Navy has to have to meet its commitments. If there were some reevaluation of those roles and missions, we would have enough money to buy F-14's at the rate of 35 a year.

We would have enough to continue purchasing EA-6B, the advanced capability version, we would have enough to go into multiyear contracts on E-2 sooner than we are and so forth and so on. But that is not the real world today. What is the real world today is that we have limited dollars available, and we are struggling to make do with what we have available. We don't like—I don't like all of the decisions that were made by the Secretary of Defense as this amended budget was submitted, but we can live with those decisions for at least the short run.

We have enough A-6's to populate our aircraft carriers until the A-12 comes in. We have enough F-14's to populate the aircraft carriers until the NATF comes in, but it must come in somewhere near the time we expect. It is not something I like because there is tremendous risk associated with that. We don't know whether these other airplanes are going to continue to be on schedule or whether they are going to slip.

There is continual risk. That is about all I can say. Oh, by the way, not to dispute my Chairman of the Joint Chiefs, but the A-12, to my knowledge, has not slipped. There has been a shifting of numbers buying fewer each year, but the program itself has not slipped. I wanted to say so, to set the record straight.

But I don't know what else I can say.

Mr. HOCHBRUECKNER. Well, let me just respond to the ATA slip. Obviously if you slip them out and buy fewer, then your ability to replace the A-6 shortage stretches out.

Admiral DUNN. Yes, sir.

Mr. HOCHBRUECKNER. Thank you, Admiral, thank you, Mr. Chairman.

The CHAIRMAN. Mr. Weldon.

Mr. WELDON. As a member of the Seapower and the Research and Development subcommittees I appreciate the opportunity to sit through this hearing today and participate. I also take great pride in considering myself not to be a fair weather friend of the Department of Defense.

My votes have been matched with my rhetoric about the need to fully support the defense of this Nation, both in subcommittee, full committee and on the floor of the House. I am somewhat taken aback and I guess surprised by Mr. Pyatt, your testimony today on the reasons that you gave for cancellation of the V-22.

I have sat through all the hearings that this committee, the full committee and the subcommittees have held where the V-22 has been discussed, starting with the testimony of Secretary Cheney, Admiral Crowe, before the full committee and the Seapower Subcommittee last week when we had Secretary Garrett, Admiral Trost and General Gray. In all of those hearings the two reasons why the V-22 was canceled, and I say the two reasons because this was started by Secretary Cheney and carried through were the reasons of narrow defined mission and affordability.

You have now raised other issues that have not been raised by any of these individuals in the past, and that surprises me. Let me say on the two issues that Secretary Cheney raised, and we have a bipartisan group of members meeting with him at 4:00 today on these issues. I think the record states and the testimony that we have got now, both by General Gray and most recently today by General Pitman, that on the issue of narrow definition of mission, that has, in fact, been negated. We have heard it time and again from both individuals and from other individuals throughout the military community that V-22 in fact has a broad mission. We talk about the needs that we have as a Nation.

Obviously, I guess the real large threat that we have is that of the threat for nuclear attack, but I think the most—the highest probability of threat we have is that of what I would call the low to medium intensity conflict. We have seen the Marine Corps and Special Forces have to respond to that conflict on several occasions in recent times, and some of them have been mentioned both today and in previous testimony, and I think that is where our dollars should be placed, to protect those men who were out there on the front where we realistically expect that we are going to have confrontation over the next 10 to 20 years.

But the second issue of affordability is one that I just want to focus on briefly because I think the bulk of the questions have been asked today. I am not going to repeat them, but I have one specific question, and that is in the studies that were done to meet the mission for the Marine Corps and Special Forces on the alternative V-22, and I understand there were at least three studies that have been done. I won't go into details on them, but all those studies pointed up the fact that the alternatives were not acceptable, either, one, because they were in fact more expensive or the one that was, in fact, decided to be least expensive was, in General Gray's words, just not possible to carry out. The double-sling concept sounded good on paper, but from a practical standpoint, the Marines would have a very difficult time employing that technique in a hostile situation. The other thing that I guess in terms of the alternatives is that I think we continually get back to the hard dollar procurement costs of the V–22 versus the alternatives, the CH–53's and H–60's.

Yet I have heard consistently the discussion of the need for more pilots, the life cycle costs that are going to increasingly be associated with the alternative to the V–22, which would be the H–53, H–60 alternative. Now, obviously, the Marine Corps presented that data, I guess, to you, Secretary Pyatt and to the Department of Defense.

My question is, why wasn't that data bought? Did you not believe the Marine Corps? Did you believe they used wrong assumptions or did you just believe that they were inflating their cost estimates? Because I think the data speaks for itself, and their alternatives that were provided to you I think have emphatically shown that the alternatives that have been recommended by the Navy now are in fact—the Department of Defense now is, in fact, more costly over the 20-year life cycle than the V–22 would be.

Mr. PYATT That is a long question. First of all, I would like to respond to an earlier statement you made. I would like to just tell the Chairman that Mr. Weldon has been a strong and consistent supporter of the Navy. He has been a knowledgeable critic when we deserved it, and he has been quite willing to support us when he thought we were right and tell us when we were wrong and most of the time he has been right. So I would just like to add that little bit.

On the question—when the Navy took the program to OSD, the V–22 was included in the Navy program. The information developed in OSD and presented to Mr. Cheney and considered by Mr. Cheney, came from a variety of sources. They wound up with—persuaded him to reach the conclusion he made and I support that conclusion.

It involved the various things that he talked about. I was not a first-hand participant in the decision-making process so I just can't relate to you what might have went on. I am sorry.

Mr. WELDON. Thank you. That clarifies a point for me that perhaps I misunderstand. So perhaps both the Navy and your office, Mr. Pyatt, are in fact in agreement that the alternative to the V–22 in effect over the life cycle 20-year period of the V–22 would in fact be more costly than if we employed the V–22, from all costs considered, not just hard procurement dollars alone.

Mr. PYATT We felt that in the program that we put together after considerable internal debate because we were given an amount of money and we had to make cuts some place, and undoubtedly if the Navy list of cuts came out there would be just as many dissatisfied people as there are today. But we made the judgment that for the program that we had to put together this was our preferred approach. You know, that is the way the process runs. The services are allowed to make a presentation, we take them to OSD for presentation.

The Secretary of Defense has a right to consider all that and put together his program. That is the way it is.

Mr. WELDON. I understand that. But you still haven't answered my question. My question is of the 20-year life cycle costs of developing the V–22, the alternative plan that was presented to Secretary Cheney, in fact, supported by the Marine Corps and by the

Navy and now buy yourself from what I understand show that the alternative program, the H-53, H-60 alternative, with all other costs considered, costs of training, costs of retrofitting the H-53, the cost of additional pilots in fact is more costly over the 20-year life cycle when you add all that together than the V-22.

Correct or not correct?

Mr. PYATT We didn't cross that bridge. Sometime ago we crossed a bridge in deciding to proceed with the V-22 development. That was some years ago. We looked at that time at alternatives with helicopter, various helicopter missions and concluded at that time that in the environment that we were in, in the financial environment we were in, that V-22 program was the most effective program.

It wasn't the cheapest program, but for the consideration of what the Marine Corps was trying to get into the Marine Corps in terms of flexible response and a rapid response, it was a good program to meet the military requirement. We put together the acquisition program, presented it to the Congress, presented it to OSD, and there was quite a bit of debate about that program.

You are on the R&D committee and undoubtedly heard it. We presented the programs. But at this time, in this budget cycle, we did not consider the alternative of CH-53 and CH-60.

Mr. WELDON. Once again I guess I should go to General Pitman or Admiral Dunn to answer the question because I think the point once again that I am getting back to is that when the cost comparisons were made, I know that the figures that were provided to the Secretary of Defense showed that the alternatives—the full cost of the alternatives to the V-22, not just the hard dollar procurement costs this year or in our-years, but the long-term costs, life cycle costs of the V-22 versus the alternatives, the V-22 was, in fact, cheaper, and that is all I want to get on the record.

Admiral Dunn, would you care to answer this?

Admiral DUNN. It is very difficult to answer because none of us were present when the Secretary of Defense was presented these figures. We know that we presented to some of his staff the figures that showed the cost to be more.

Mr. WELDON. That is all I need to know. The Navy, the Marine Corps presented the data to the Secretary showing him that in fact over the 20-year life cycle the V-22 was the more cost-effective solution. I would ask my friend, General Pitman, to respond to that also.

General PITMAN. That's correct, sir.

Mr. WELDON. Thank you very much. I think that is the second phase of the two major arguments that were given by Secretary Cheney of narrow mission and affordability. We have now gotten testimony on the record that it is not a narrow mission and that in fact the most affordable long-term solution to meet the mission to the Marine Corps and the Special Forces have is the V-22. Thank you.

Turn back my time.

The CHAIRMAN. Thank you. You certainly worked hard to get that answer.

Mr. WELDON. Yes.

The CHAIRMAN. Gentlemen, we thank you for being here today. We thank you for your knowledge and candor and the subcommittee will stand adjourned to the call of the Chairman.

[Whereupon, at 12:30 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

[The following questions were submitted to be answered for the record:]

QUESTIONS OF CONGRESSMAN BEN BLAZ
FOR
MAY 11, 1989 HEARING
PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

To: **The Honorable Everett Pyatt**
Assistant Secretary of the Navy
Shipbuilding and Logistics

1. Has there been any direction given to the Department of the Navy in view of DepSecDef Atwood's testimony before SAC last week that DoD was studying several program options?
2. How much funding in FY90 could be "recaptured" from proposed alternatives to V-22, and be restored to V-22? RDT&E? Procurement?
3. If the V-22 were restored to the DoD budget, what would be a realistic approach -- a simple restoration of the FY90/91 budget request or a restructured program?

To: **Adm. Robert Dunn**
Asst. Chief of Naval Operations

1. From a technological risk standpoint, how would you evaluate the V-22 program today as opposed to when it began?
2. Is the Department of the Navy willing to request the reprogramming of any of the FY89 V-22 long lead procurement funding to continue the R&D effort through the end of FY89?

To: Lt. Gen. **Charles Pitman**
Dep. Chief of Staff - Aviation
United States Marine Corps

1. Over the past several years Congress has appropriated funds each year for two (2) KC-130 tankers to modernize and expand the Marine Reserve tanker capability.
   a) How is this program progressing?
   b) How many aircraft have been funded and how many more do you need to meet your total requirements?

Lt. Gen. Pitman

2. How do you respond to concerns expressed by some that the mission of the V-22 is too narrow to justify the cost of the program?

3. During discussions of alternatives to the V-22 there has been a lot of talk about using dual slings on the CH-53E to reduce the number of CH-53Es required. Would you explain what "dual sling" means and give us your personal assessment on the soundess of this idea?

4. The V-22 flew for the first time on March 19th, and the first phase of the flight test program has been completed. Please give us your assessment of the flight test program thus far, and also when you anticipate complete conversion from the vertical mode to the horizontal mode of flight?

STATEMENT OF CONGRESSMAN ROY DYSON
SUBCOMMITTEE ON PROCUREMENT AND MILITARY NUCLEAR SYSTEMS
MAY 11, 1989

MR. CHAIRMAN, WE ALL RECOGNIZE THE FACT THAT THE FISCAL YEAR '90 BUDGET WILL FACE BUDGETARY CONSTRAINTS THAT WE HAVE NOT SEEN IN NEARLY A DECADE. THE BUILD-UP THAT WE HAVE OVERSEEN MUST NOW BE SLOWED AND WE MUST CAREFULLY DETERMINE WHICH PROGRAMS ARE ESSENTIAL TO OUR NATION'S SECURITY.

WHILE I BELIEVE THAT THE SERVICES AND THE SECRETARY OF DEFENSE HAVE MADE MANY DIFFICULT PROGRAM DECISIONS IN RECENT WEEKS, I BELIEVE THAT ONE CRITICAL AREA NEEDS TO BE REVISITED. THIS AREA IS THE AIR SUPPORT OF OUR CARRIER GROUPS.

IN TODAY'S TESTIMONY, WE HAVE BEEN TOLD THAT THERE IS "NO SUBSTITUTE FOR AIR AT SEA." FURTHERMORE, I NOTE THAT NOT ONLY DO WE FACE THREATS FROM ADVANCING SOVIET TECHNOLOGY, OUR MILITARY PERSONNEL ALSO FACES VERY REAL RISKS FROM THE IMPROVED WEAPONS AVAILABLE TO THE GROWING THIRD WORLD NATIONS.

OUR PARTICIPATION AND LOSSES IN THE PERSIAN GULF HAVE SHOWN THAT PROTECTION OF OUR NAVAL FLEET MUST REMAIN A PRIORITY OF THE NAVY'S ADMINISTRATION. THEREFORE I AM EXTREMELY CONCERNED ABOUT THE PLAN TO CANCEL THE F-14D WHICH HAS PROVEN ITSELF TO BE ONE OF OUR BEST AVIATION PROCUREMENTS. IN ADDITION, I AM CONCERNED THAT OTHER ASPECTS OF OUR FLEET'S AIR SUPPORT SYSTEM MAY BE FORCED TO PROVIDE INADEQUATE PROTECTION DUE TO A LACK OF AVAILABLE AIRCRAFT. THIS WILL NOT HAPPEN IN 1990, BUT IT WILL HAPPEN IN THE OUTYEARS AND IT WILL BE A REAL PROBLEM IF WE DO NOT LOOK AT THOSE NEEDS TODAY. I HOPE THAT OUR NAVAL FRIENDS WHO ARE HERE TODAY WILL REVISIT SOME OF THEIR FUNDING DECISIONS TO ENSURE THAT OUR FLEET AND ITS PERSONNEL RECEIVE THE PROTECTION THEY DESERVE.

QUESTIONS OF CONGRESSMAN ROY DYSON
Subcommittee On Procurement & Military Nuclear Systems
May 11, 1989

Q: THE COMMITTEE UNDERSTANDS THAT THE F-14 FORCE LEVEL REQUIREMENT STATED IN THE NAVAL AVIATION REQUIREMENTS REPORT WAS AMENDED IN APRIL. WHAT IS THE CORRECT F-14 STRUCTURE REQUIREMENT?

Q: HOW MANY F-14S ARE IN SERVICE TODAY?

Q: HOW MANY ADDITIONAL AIRCRAFT ARE FUNDED THROUGH FY '89?

Q: WHAT F-14 ATTRITION RATE DOES THE NAVY PLAN FOR?

Q: IT WOULD SEEM THAT, AT 8 AIRCRAFT PER YEAR, THE NAVY WILL START FALLING BELOW ITS INVENTORY REQUIREMENT IN ONLY FOUR YEARS. HOW DOES THE NAVY PLAN TO MAINTAIN FORCE STRUCTURE UNTIL A REPLACEMENT AIRCRAFT FOR THE F-14 COMES ON-LINE?

Q: WITHOUT NEW PRODUCTION, HOW DOES THE NAVY PLAN TO COUNTER THE COMBINED EFFECTS OF ATTRITION PLUS END-OF-LIFE RETIREMENTS IN FY '89 AND BEYOND?

Q: THE NAVY IS ON RECORD AS DESIRING AN ALL F-14D FLEET BY CALENDAR YEAR 2000. IS THAT NOT TRUE?

Q: DOES THE NAVY STILL BELIEVE THAT F-14D TECHNOLOGY IS REQUIRED TO COUNTER THE THREAT IN THE NEXT DECADE?

Q: HOW MANY PRODUCTION F-14D AIRCRAFT ARE FUNDED?

Q: HOW MANY F-14A AND A+ AIRCRAFT DOES THE NAVY PLAN TO REMANUFACTURE?

Q: WHAT IS THE F-14 FORCE STRUCTURE REQUIREMENT?

Q: HOW DO YOU PLAN TO BUILD A 471 F-14D FORCE STRUCTURE WITHOUT CONTINUED EW PRODUCTION?

Questions to be directed to VADM Robert Dunn

Q: THE 1989 NAVAL AVIATION REQUIREMENT REPORT STATES THAT YOU NEED 147 OPERATIONAL EA-6B AIRCRAFT IN INVENTORY. MY ANALYSIS SHOWS THAT YOUR INVENTORY IN 1996 WILL BE SHORT OF THAT REQUIREMENT BY 36 AIRCRAFT. WHY AREN'T YOU FUNDING THE BUILDING OF ADDITIONAL AIRCRAFT IN FY '90 AND '91 TO MEET THOSE SHORTFALLS?

Q: YOU HAVE STATED THAT THE EA-6B ADVANCED CAPABILITY PROGRAM IS ONE OF THE NAVY'S "URGENTLY NEEDED REPLACEMENT PROGRAMS." YET YOU HAVE REQUESTED ONLY $147 MILLION TOTAL IN FY '90 FOR THE ENTIRE EA-6B PROGRAM. DOES $147 MILLION FULLY FUND THE REQUIREMENTS FOR URGENTLY PLACING EA-6B ADVANCED CAPABILITY INTO THE FLEET WITH ALL THE NECESSARY SUPPORT COSTS?

Q: WITH AN EVOLVING SOPHISTICATION OF THE ENEMY'S RADAR THREAT AND THE INTRODUCTION OF OUR STEALTH AIRCRAFT INTO SERVICE, DOES THE NEED FOR THE EA-6B ADVANCED CAPABILITY PROGRAM INCREASE OR DECREASE?

1. ADMIRAL, IT IS MY UNDERSTANDING THAT THE CARRIER-BASED S-3A AIRCRAFT IS BEING UPGRADED TO AN S-3B CONFIGURATION, AND THAT THIS MODIFICATION IS WORKING OUT QUITE WELL. ADMIRAL, WOULD YOU PLEASE TELL US WHERE YOU ARE ON THE PROGRAM.

2. ADMIRAL, HOW MANY KITS ARE YOU REQUESTING THIS YEAR AND, IN THE CONTEXT OF YOUR CURRENT PLANNING, WHEN WILL THE PROGRAM BE COMPLETED?

3. ADMIRAL, IT IS MY UNDERSTANDING THAT THIS PROGRAM WAS INITIALLY SCHEDULED TO BE COMPLETED IN FY-90. IS THE REQUEST FOR TEN (10) KITS THIS YEAR AN ECONOMICAL RATE OR ARE WE DEALING WITH A BUDGETARY PROBLEM?

4. ADMIRAL, IF THIS COMMITTEE COULD SOMEHOW FIND ADDITIONAL FUNDING, WOULD IT BE FAIR TO SAY THAT YOU WOULD SUPPORT INCREMENTING THE S-3B TO SAY, AN ECONOMICAL BUY OF TWENTY-FOUR (24) KITS THIS YEAR?

Question: Over the past several years Congress has appropriated funds for two (2) KC-130 tankers to modernize and expand the Marine Reserve tanker capability.

a) How is this program progressing?

b) How many aircraft have been funded and how many more do you need to meet your total requirements?

Answer: With the new KC-130 tankers that Congress has provided the Marine Corps Reserve, we have been able to stand up a new squadron at Stewart, NY, and are replacing the Marine Corps' oldest tankers at Glenview, IL, with new ones. Congress has appropriated funds for 18 new KC-130T tankers. We require eight additional KC-130T's to fill both squadrons with new aircraft and provide pipeline assets.

Question: How do you respond to concerns expressed by some that the mission of the V-22 is too narrow to justify the cost of the program?

Answer: The V-22 was specifically developed to fill unique mission requirements for the four services as follows:

Army	Tactical Mobility
Navy	Combat Rescue and Special Warfare Logistics
AF	Special Operations
Marines	Assault Medium Lift National Executive Transport

No less that 26 mission applications were documented in a memorandum forwarded by OSD, PA&E on 16 Jan 84 in response to a Congressional inquiry.

The Marine Corps' warfighting philosophy, whether engaged in missions requiring amphibious operations or sustained combat operations ashore, is based on the concept of rapid, flexible and bold maneuver. With our relatively light, mobile force, our intent is to avoid frontal assault, attrition-style warfare into strongly defended enemy positions so characteristic of World War II. The speed, range and endurance of the MV-22 would allow us to shape the battlefield decisively to our advantage by projecting combat power from less vulnerable areas to lightly defended objectives well into the enemy's vital area. By using maneuver effectively, a smaller assault force can achieve decisive superiority at a time and place of its choosing.

The MV-22 would also enhance our strategic deployability. Its 2100nm unrefueled range would allow the Marine Corps to self-deploy the MV-22's associated with a maritime prepositioned force, Marine Expeditionary Brigade (MEB) or the Norway air-landed MEB. This capability would significantly reduce closure time and facilitate the rapid introduction of Marine forces ashore, while conserving scarce strategic airlift for other priority missions.

Question: During discussions of alternatives to the V-22, there has been a lot of talk about using dual slings on the CH-53E to reduce the number of CH-53Es required. Would you explain what "dual sling" means and give us your personal assessment on the soundness of this idea?

Answer: The dual sling load refers to carrying two High Mobility Multipurpose Wheeled Vehicles (HMMWVs) externally using the two point cargo hook suspension system of the CH-53E. The two HMMWVs are connected at the rear bumpers to stabilize the load. Using the two independent cargo slings, the vehicle weights are distributed to the forward and aft cargo hooks on the CH-53E. The dual HMMWV load is within the capabilities of the CH-53E and carrying two HMMWVs would be satisfactory under administrative conditions. The time required to rig and de-rig the HMMWVs would probably tie up flight deck space, reduce tactical flexibility, and increase exposure time and vulnerability. The concept of dual sling loading the HMMWV has not been fully developed and operationally tested. Although the dual sling may have tactical application in some cases (movement from one staging area to another) its use would not be suitable during the initial waves of an assault operation or in most tactical situations in a hostile environment.

Question: The V-22 flew for the first time on March 19th, and the first phase of the flight test program has been completed. Please give us your assessment of the flight test program thus far, and also when you anticipate complete conversion from the vertical mode to the horizontal mode of flight?

Answer: The flight test program has progressed extremely well since that first flight on March 19th. Aircraft One has successfully flown a total of nine times and additional instrumentation is currently being added to the aircraft in preparation for flight in the fixed-wing mode. Anticipate full conversion to the fixed-wing mode by end of July. By the end of September we expect four more FSD aircraft to be flying and the flight envelope will have been expanded to 10,000 altitude, 250 knots, and 2 G's.

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The average recurring unit flyaway cost at a rate of 18 per year for new production F-14D aircraft when combined with the current remanufacture program is estimated to be $46.8 million.

V-22 OSPREY AIRCRAFT

Question. From a technological risk standpoint, how would you evaluate the V-22 program? When it began? How about today?

Answer. At the beginning, overall program risk was assessed as medium. As of today, program risk is assessed as low to medium.

Question. Is the Department of the Navy willing to request the reprogramming of any of the fiscal year 1989 V-22 long lead procurement funding to continue to R&D effort through the end of fiscal year 1989?

Answer. No the fiscal year 1989 Research and Development effort is based on a firm fixed price contract and is already fully funded. Therefore, reprogramming is not required.

F-14

Question. What is the correct F-14 structure requirement?

Answer. As stated in the Naval Aviation Requirements Report, 458 is the programming objective. Inventory levels are adjusted to reflect President Bush's budget decisions.

Question. How many F-14's are in service today?

Answer. At present (11 May 1989), there are 477 F-14 aircraft in the inventory.

Question. How many additional aircraft are found through fiscal year 1989?

Answer. Twelve aircraft each were funded in fiscal year 1988 and fiscal year 1989 for delivery in fiscal year 1990 and fiscal year 1991 respectively.

Question. What F-14 attrition rate does the Navy plan for?

Answer. Based on historical data, the Navy plans an attrition rate of 2.3 percent of the Program Active Inventory. For the F-14 program, this results in a planned loss of 8-9 aircraft per year.

Question. How does the Navy plan to maintain force structure until a replacement for the F-14 comes on-line?

Answer. At the current attrition rates, the Navy will fall below its force structure requirement in 1995. The shortage will gradually increase to the 50-60 range by the year 2000. Management of that shortage will be challenging but not insurmountable. If simultaneous deployment of all carriers is required, aircraft will be taken from pipeline or training assets to ensure each deploying carrier is fully equipped.

Question. Without new production, how does the Navy plan to counter the combined effects of attrition plus end-of-life retirements in fiscal year 1989 and beyond?

Answer. Shortages due to attrition through the 1990's will be managed from pipeline and training assets. The first F-14 retirement based on a 7,500 hour service life is not expected until 2001. Production schedules for the NATF will have to be planned to compensate for the loss of F-14s due to combined attrition and retirements beyond that year.

Question. The Navy is on record as desiring an all F-14D fleet by calendar year 2000. Is that not true?

Answer. Yes, that is true.

Question. Does the Navy still believe that F-14D technology is required to counter the threat in the next decade?

Answer. Yes. The F-14A/AWG-9 system was designed in the 1960's, first deployed in 1973, was compromised in 1978, and has never had a major upgrade until now. That compromise and the emerging threat technology have already resulted in the loss of the F-14A multi-shot capability in many scenarios. The upgrades programmed for the F-14D are the minimum necessary to pace the threat through the 1990's and beyond.

Question. How many production F-14 aircraft are funded?

Answer. Nineteen (seven in fiscal year 1988 and 12 in fiscal year 1989).

Question. How many F-14A and A+ aircraft does the Navy plan to remanufacture?

Answer. 400.

Question. What is the F-14 force structure requirement?

Answer. 458.

Question. How do you plan to build a 471 F-14D force structure without continued new production?

Answer. The current world political situation and fiscal climate have forced the Navy to revisit the original goal of an all F-14D force. Based on the current program and projected inventory in the year 2000, the Navy expects to have all active airwings equipped with the F-14D. Only the Reserve airwings will remain in the F-14A.

EA-6B

Question. The 1989 Naval Aviation Requirement Report (NARR) states that you need 147 operational EA-6B aircraft in inventory. My analysis shows that your inventory in 1996 will be short of that requirement by 36 aircraft. Why aren't you funding the building of additional aircraft in fiscal year 1990 and 1991 to meet those shortfalls.

Answer. Within fiscal constraints, the associated risk of not procuring additional EA-6B aircraft is a function of actual attrition (presently predicted to be 3 percent per year) and the speed with which a replacement aircraft is fielded. The risk at this time is considered acceptable due to present budget constraints, notwithstanding there is little margin for contingency requirements.

Question. You have stated that the EA-6B Advanced Capability (ADVCAP) Program is one of the Navy's "urgently needed replacement programs". Yet you have requested only $147 million fully fund the requirements for urgently placing EA-6B Advanced Capability into the Fleet with all the necessary support costs?

Answer. The $147 million provides for non-recurring engineering, support and advance procurement required to commence EA-6B ADVCAP procurement in fiscal year 1991.

S-3B

Question. Admiral, it is my understanding that the carrier-based S-3A aircraft is being upgraded to an S-3B configuration, and that this modification is working out quite well. Admiral, would you please tell us where you are on the program?

Answer. The development program is complete, 83 of the planned 144 kits have been procured, and 27 aircraft have completed modification.

Question. Admiral, how many kits are you requesting this year and, in the context of your current planning, when will the program be completed?

Answer. Funding for 10 kits has been requested for this year, and based on the current plan, procurement will be completed by fiscal year 1994 with the installation completing in fiscal year 1996.

Question. Admiral, it is my understanding that this program was initially scheduled to be completed in fiscal year 1990. Is the request for ten (10) kits this year an economical rate or are we dealing with a budgetary problem?

Answer. The ten (10) kits being requested should be considered the minimum necessary to keep the program on track and takes into account a balanced Navy budget.

Question. Admiral, if this committee could somehow find additional funding, would it be fair to say that you would support incrementing the S-3B to say, and economical buy of twenty-four (24) kits this year?

Answer. I would support the increase. However, the budget, now requested, reflects a balance among all Navy programs.

ARMY PROCUREMENT AUTHORIZATION

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Thursday, May 18, 1989.

The subcommittee met, pursuant to call, at 10 a.m., in room 2118, Rayburn House Office Building, Hon. Les Aspin (chairman of the subcommittee) presiding.

STATEMENT OF HON. LES ASPIN, A REPRESENTATIVE FROM WISCONSIN, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

The **Chairman**. The meeting will come to order.

This morning the Procurement Subcommittee will receive testimony on the Army's fiscal year 1990 budget request.

By all measures, the past decade has shown considerable success for the Army's modernization program in both qualitative and quantitative terms. The question we now face is what investment decisions should we make today in order to properly position ourselves for the next generation of equipment, whether new production or major modifications.

But the next generation of equipment does not appear to be ready to enter production until the mid to late 1990s, and at current production rates, we may find we have bought more of today's equipment than is required before tomorrow's hardware is available or ready for production. This problem may only be exacerbated if further force structure reductions are taken in the interim. Thus, today's issue is finding the correct balance between maintaining an industrial base to support production in the near term and investing in future programs. This is particularly difficult in an area of dwindling resources.

It appears that the proposed Davis-Cheney package may offer an approach that establishes a balance recognizing limited resources. Although we may not endorse all elements of the budget proposal, the subcommittee needs to examine in those terms the proposed Cheney package in its entirety for fiscal year 1990.

I am hopeful our witnesses can expand on these issues and address the risks associated with the competing demands.

We are pleased to have with us today the Honorable Jay R. Sculley, Assistant Secretary of the Army for Research, Development and Acquisition; Lt. Gen. Donald S. Pihl, Military Deputy to the Assistant Secretary for Research, Development and Acquisition;

and Brig. Gen. Alfred J. Mallette, Deputy Director for Command, Control, Communications and Computers.

Bob Davis, do you have any comment?

STATEMENT OF HON. ROBERT W. DAVIS, A REPRESENTATIVE FROM MICHIGAN

Mr. DAVIS. Thank you, Mr. Chairman. I am pleased to welcome our witnesses today. I might say this probably will be the last time Dr. Jay Sculley will be appearing before this subcommittee. He has served his country, the Army, the DOD, very well for the last 8 years. He has been very honest, very forthright in his testimony before this subcommittee and others. I think he has helped the Army chart a course for the future of modernization. I just want to say that I am very pleased to be here today, and we wish you nothing but the best for you and your family in your future endeavors.

The CHAIRMAN. On behalf of the whole committee, let me endorse the comments Bob just said about you, Dr. Sculley, and say we really do appreciate all that you have done and all the help you have been to this committee. Sir, the floor is yours, and then anybody also on the panel that would like to speak. We would like to hear what you have to say and ask you some questions.

STATEMENTS OF JAY R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT AND ACQUISITION; AND BRIG. GEN. ALFRED J. MALLETTE, DEPUTY DIRECTOR, PLANS, PROGRAMS AND SYSTEMS, OFFICE OF THE DIRECTOR OF INFORMATION SYSTEMS FOR COMMAND, CONTROL, COMMUNICATIONS AND COMPUTERS

Dr. SCULLEY. Thank you very much, Mr. Chairman. It is not only a pleasure to appear before the committee, it continues to be an honor. Rather than make a lengthy oral statement, I have submitted a written statement which I would appreciate having entered into the record, and I have also provided an addendum to the budget chapter of our posture statement which we submitted earlier this year. The addendum reflects adjustments made to our current programs as required by the President's amended budget submission.

As you have identified, with me today are Lt. Gen. Don Pihl, and Brig. Gen. Alfred Mallette. It is an honor to have served with people of their quality during the past 8 years, and with your permission, General Pihl will present an overview of our budget amendment process and its subsequent results, and from there we would like to go directly to your questions, sir.

The CHAIRMAN. General Pihl, the floor is yours.

STATEMENT OF LT. GEN. DONALD S. PIHL, MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT AND ACQUISITION

General PIHL. Thank you, Mr. Chairman.

It is a pleasure to appear before this committee to describe how the Army proposes to equip and arm itself. Recently we have presented the Congress with a 1990–1991 budget for research and development and acquisition for $19.9 billion in 1990 and $20.4 billion in 1991. That request presents our best effort to provide a balanced program to maintain near-term readiness, continue the momentum in our modernization programs, and to focus on research and development efforts that recognize the greatest potential for improving our war-fighting capability.

The reduced Army procurement budget before the committee today is a result of rigorous review. Our decisions were guided by several principles intended to maximize our deterrent and war-fighting capabilities at the least cost to the taxpayer. Within the context of overall Army needs, we made every effort to maintain essential force readiness with the priority to forward deploying, early deploying and special operations forces.

Second, we wanted to protect essential sustainability by addressing the CINCs' highest needs and acquiring only the most needed facilities and then to continue modernization through economic procurement of our most needed equipment.

We were forced to cancel some procurement programs to provide economic production rates for others and to provide for readiness and sustainability of existing forces. When viewed in the context of the total Army, we believe we have provided a balanced program to best meet the Army's needs.

Sir, if I might, I have two charts on the back of my reading statement numbered number 1 and number 2. At the top of each chart is the President's budget, chart number 1 being RDT&E, and chart number 2 being procurement. In the columns that follow are the adjustments to the budget for both RDT&E and for procurement, and I will not dwell on the R&D chart given this is the Procurement Subcommittee, but I did want to point out to the committee that what we did was to protect RDT&E, because we believe that the future of the Army and our ability to leverage technology is critical.

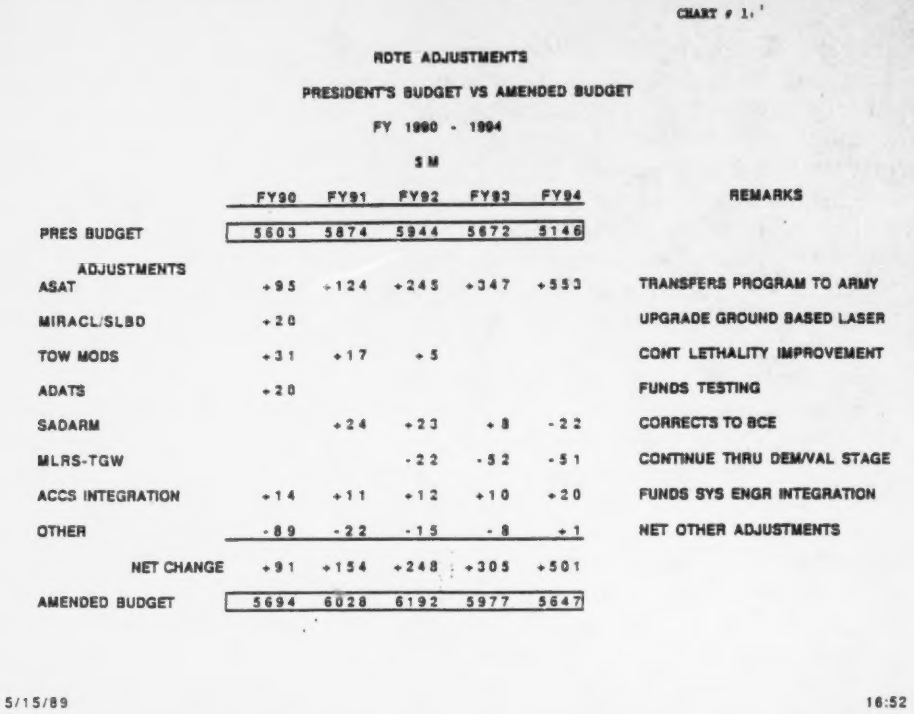

CHART # 1.

RDTE ADJUSTMENTS

PRESIDENT'S BUDGET VS AMENDED BUDGET

FY 1990 - 1994

$ M

	FY90	FY91	FY92	FY93	FY94	REMARKS
PRES BUDGET	5603	5874	5944	5672	5146	
ADJUSTMENTS						
ASAT	+95	+124	+245	+347	+553	TRANSFERS PROGRAM TO ARMY
MIRACL/SLBD	+20					UPGRADE GROUND BASED LASER
TOW MODS	+31	+17	+5			CONT LETHALITY IMPROVEMENT
ADATS	+20					FUNDS TESTING
SADARM		+24	+23	+8	-22	CORRECTS TO BCE
MLRS-TGW			-22	-52	-51	CONTINUE THRU DEM/VAL STAGE
ACCS INTEGRATION	+14	+11	+12	+10	+20	FUNDS SYS ENGR INTEGRATION
OTHER	-89	-22	-15	-8	+1	NET OTHER ADJUSTMENTS
NET CHANGE	+91	+154	+248	+305	+501	
AMENDED BUDGET	5694	6028	6192	5977	5647	

5/15/89 16:52

So if I can just refer you to the left-most column under fiscal year 1990, we started the request at $5,603,000,000, and we finished with the Bush budget at $5,694,000,000. The principal addition in RDT&E was the Army's newest mission, the antisatellite capability which was transferred from the Department of the Navy to the Army.

The rest of the programs, sir, were plus-ups to the R&D accounts to take advantage of technology and to adjust in the fire support arena where we had some ability to do some R&D for SADARM and Multiple Launch Rocket System/Terminally Guided Warhead (MLRS/TGW).

CHART 2

PROCUREMENT ADJUSTMENTS
PRESIDENT'S BUDGET VS AMENDED BUDGET
FY 1990 - 1994
$ M

	FY90	FY91	FY92	FY93	FY94	REMARKS
PRES BUDGET	14890	15237	18292	19233	20215	
ADJUSTMENTS:						
MLRS LAUNCHERS	+60	+60	+60	+60	+60	ACCEL 1 BN/YR 8" REPLACEMENT
AHIP	-299	-328	-362	-360	-351	TERMINATES PROGRAM
UH-60	-32	-32	-36	-44	-137	PROC AT EPR FY90-94; TERM MSIP
AH-64	-38	+17	-856	-781	-199	PROC 66 FY90-1; TERMINATE IN 92
AAWWS			-39	-131		REDUCES MSL & FIRE CTL SYS
ADATS	-149	-114	-119	-156	-142	REPROFILE; 1 YR SLIP IN IOC
ATACMS	-55	+11	+8	+29	+23	ADJUSTS DELIVERY PERIOD
IRV	-3	-90	-97	-90	-32	TERMINATES PROGRAM
M1 TANK MODS		-90	-110	-110	-50	RESTRUCTURE. DEFERS EXCEPT FP I
SINCGARS	-25	-50	-65	-75	-75	REDUCES APPROX 14000 RADIOS
MSE		-277				ELIMINATE 2 DIV SETS
AFATDS				-50	-70	DELAYS FP I FLDG 12-18 MOS
FMTV			-40	-100	-100	REPROFILE - REDUCES TRAILERS
HET			-37	-48	-44	DELETES HET FOR T-11 DOZER
REPLEN SPARES	-18	-45	-71	-65	-225	REDUCE WAR RES SECOND ITEMS
AMMO	-31	+32	-5	-221	-731	STRETCH XM900E1; ADJUSTS SADARM TO BCE; FY93-94 AT $1.7B
OTHER	-134	-8	-201	-281	-327	
NET CHANGE	-724	-914	-1970	-2433	-2400	
AMENDED BUDGET	14166	14323	16322	16800	17815	

5/16/89 14:34

Sir, now if I could focus the committee on my second chart. To meet the overall fiscal constraints, we reduced Army procurement accounts by 724 million in fiscal year 1990 and 914 million in fiscal year 1991, with an additional $6.6 billion reduction planned for fiscal year 1992 through 1994. We accomplished this reduction by stretching some vital programs and by terminating some procurements.

We examined each program against the following criteria; first, the impact on war-fighting capability; second, modernization by force package with priority toward our first-to-fight units for our newest equipment; then to maintaining lethality and survivability, eliminating systems with limited improvements to force effectiveness. Finally good business practices, where we tried to procure at economic rates, provide for multiyear procurements where practical, adjust profiles based on testing results and progress of programs in development or production, and the review of programs for cost growth and execution and to provide essential trucks, radios and support equipment necessary to protect our war-fighting capability.

Using these guidelines, we carefully examined each program from the Abrams Tank and AHIP to the need for training devices. Difficult choices had to be made since available funding would not support all of our programs. Critical decisions were made on several programs. Fire support funding was increased consistent with our belief that we must accelerate the retirement of the 8-inch Howitzer and replace them with the multiple-launch rocket system (MLRS), providing greater range and lethality for foreign division and enhancing our conventional capability.

An additional battalion of MLRS was added. The Army Tactical Missile System (ATACMS) funding line was re-profiled based on a delay in the exercise of the low rate production contract option. This revision to ATACMS reduces quantities by 124 missiles in fiscal year 1990 and will increase production costs about 20 percent because the Army will be re-negotiating the contract in those years rather than exercising previously negotiated, not-to-exceed price production options. Aviation reductions were the most significant and will degrade our mid-term reconnaissance capability.

Continuation of the armed AHIP program was simply not affordable. Termination of this program will leave the reconnaissance mission to older aircraft without night and adverse-weather capability. Continuation of the LHX program will, however, insure reconnaissance modernization by the late 1990s.

Attack aircraft capability will be maintained through production of the AH-64 helicopter through fiscal year 1991. Even though quantities were reduced over the 5-year period, essential units will continue to be equipped.

The UH-60 Black Hawk helicopter program was reduced in the near term, and the Army still plans to procure a total of 2,253 Black Hawks and should be able to continue economic rate production.

Modernization of heavy forces continues through the procurement of the Abrams Tank and Bradley Fighting Vehicle, and essentially for those two key items for the Army there was no change between the Reagan and the Bush budget.

In air defense, our programs were basically unchanged except for the line-of-sight forward heavy ADATS program which was restructured with additional RDT&E funds to support operational testing and a more deliberate procurement action. This delay will change the initial operating capability of ADATS by 1 year.

Fiscal year 1990 is a transition year for the Army truck programs. We will initiate multiyear procurements for the Palletized Loading System which will significantly improve our ammunition distribution system and will continue the multiyear procurement of the HMMWV and the Heavy Equipment Transporter. Affordability and relative war-fighting priorities did not permit funding of the M-939A2 5-ton truck or the 10-ton HEMTT. In fiscal year 1991, we will continue the HMMWV, PLS and HET multiyear contracts and initiate a multiyear contract for the new Family of Medium Tactical Vehicles (FMTV).

Major communications funding reductions were to the Mobile Subscriber Equipment (MSE) and the SINCGARS programs. The MSE program will be terminated in fiscal year 1991, resulting in not fielding the last two divisions of late deploying forces. The reduction of the SINCGARS program will result in delaying the procurement of approximately 14,000 radios beyond the FYDP program.

Several smaller reductions were made to ammunition programs, war reserve spares, communications modifications, and other support equipment based on current program execution, criticality of need and affordability. Ammunition programs were reduced to an annual level of $1.7 billion in fiscal year 1993 and 1994. These reductions are detailed in our budget submission and the FYDP.

To sum up, we are making a diligent effort to manage our R&D programs in a balanced affordable way to equip our soldiers with the quality equipment they need to prevail in case of war. This is a definite challenge in a period of declining fiscal resources. The fiscal year 1990–1991 amended budget request is the product of difficult and lengthy deliberations. It represents our best efforts to provide a balanced program to equip the Army. We must buy and allocate our new equipment with sound business sense and optimum military rationale.

Our major concern is that further reductions will erode our ability to achieve that goal. As the Chief of Staff of the Army has noted, there is no substitute for the presence of forces on the ground as our nation's clearest symbol of resolve. The main determinant in our ability to achieve a successful transition into the 1990s is adequate and stable funding.

Accordingly, we need the continuing strong support of the Congress.

Thank you, Mr. Chairman. We are ready for your questions.

The CHAIRMAN. Thank you. General Mallette, do you have some comments?

General MALLETTE. No, sir.

JOINT PREPARED STATEMENT OF DR. JAY R. SCULLEY, LT. GEN. DONALD S. PIHL AND BRIG. GEN. ALFRED J. MALLETTE

STATEMENT

It is a pleasure to appear before this committee once again to describe how the Army proposes to equip and arm itself. Today, we are presenting you with an amended FY90/91 research, development and acquisition budget request for $19.9 billion in FY90 and $20.4 billion in FY91. This request represents our best effort to provide a balanced program to maintain near term readiness, continue momentum in our modernization programs, and to focus on research and development efforts that promise the greatest potential for improving our warfighting capability.

The Army has made steady progress in its equipment posture in the 1980's, and our overriding concern is to maintain that progress as we look forward to the challenges of the 1990's. The need to keep our conventional forces strong has been further amplified by the recent signing of the Intermediate Nuclear Forces (INF) Treaty. Although the INF Treaty is a welcomed action, it poses an additional challenge to the Army to enhance its conventional capabilities.

The qualitative leverage we possess in some equipment areas must offset Warsaw Pact quantitative superiority and steady Soviet technological advances. Fortunately, we are able to build on the achievements of the 1980's, as the following summary will indicate.

Our procurement priority in this decade has been to produce and field a host of major items which had successfully completed R&D at the beginning of the 1980's. It would have been a national tragedy had we not been able to draw on this investment and equip our soldiers with the full range of these systems. With the support of Congress we have been able to do just that. We have established the momentum and the RDA strategy we want to continue to pursue: that is, produce new systems that have significant growth potential; product improve them to correspond to new threats and technological breakthroughs; buy Nondevelopmental Items commercially where that makes sense; and selectively invest in bringing high leverage new starts from R&D to production. Our overall acquisition strategy has been to buy equipment in a synchronized way across all mission areas.

Following this approach in the 1980's, the Army has fielded meaningful quantities of the best tanks and fighting vehicles in the world (66 Abrams tank battalions and 33 battalions of Bradley Fighting Vehicles). We now have two unparalleled helicopters deployed, one devastating against armor (11 attack battalions of Apache), and the other a key asset to improved mobility and logistics, the Black Hawk Utility helicopter (over 1000 now produced). PATRIOT, the most sophisticated and effective air defense missile system ever built, is now operational in nine battalions. We have given the artillery its first rocket launcher capability in 30 years (24 batteries of MLRS fielded worldwide). Copperhead, which represents the beginning of smart munitions and an artillery capability for pinpoint destruction of high value targets, has now completed procurement (over 24,000 produced or on-contract). These are just a few of the major items that have come through the production pipeline to increase our combat power.

At the same time we have product improved a host of items to stretch their capabilities to the maximum (e.g., Chaparral, Hawk and TOW missiles, AH-1S Cobra and CH-47D helicopters, M109 howitzers, Stinger missile and many other items).

Our RDA investment efforts of the 1980s have resulted in an Army better equipped to combat the threat across the entire spectrum of conflict, however, the Soviets have also made steady improvements.

For years, the West has relied upon its technological prowess to manage the military threat posed by numerically superior forces of the Warsaw Pact. Since the late 1970's, however, the Pact's quantitative advantage has been complemented by qualitative force enhancements.

Research and development by the Soviets is paying off with technological advances which rival, and possibly even surpass our own. This is particularly true for ground force weapons systems where R&D accounts for a significantly greater share of defense resources in the Soviet Union than it does in the US. Examples of high-technology ground force equipment currently entering the Soviet force include a new tank, a new tactical air defense gun system (the 2S6), new tactical advanced helicopter gunships like the HAVOC and HOKUM, and dual-capable (conventional and nuclear), self-propelled artillery.

While the current direction of internal Soviet political debate over the allocation of defense resources is likely to result in lower military procurement levels in the next 2-5 years, perhaps sooner, there is no historical precedent nor evidence to suggest defense R&D in the USSR will suffer. The use of space-based systems to enhance ground combat capabilities will also provide better warning, command and control, and synchronization of ground force actions.

Difficult as the Soviet challenge may be, however, the Army cannot concentrate exclusively on the Soviet threat. Every reasonable forecast envisions continued instability and conflict in the Third World. Opposition forces will have at least a few weapons systems comparable to or better than our own. In some cases, they already possess a full range of modern, sophisticated weapons which are available from the world arms markets or from sponsors such as the Soviet Union.

The Chemical/Biological Warfare threat is worldwide, growing and changing in character. The Soviet Union continues to take advantage of emerging technologies in the fields of biotechnology and genetic engineering to develop new agents. These new agents result in the potential for technological surprise that poses unique challenges to our defensive capabilities. As with the conventional threat, we cannot focus just on the Soviet capability. The proliferation of chemical capability throughout the world has grown at an alarming rate. Third World countries view chemicals as a cheap and effective weapon, as was seen in the Iran/Iraq War. Forces deployed to Third World contingencies now face great risk.

The Army must continue to vigorously pursue R&D efforts in order to meet future threats. We cannot again neglect the future of R&D, as we did during the Vietnam era, and expect to regain superiority quickly. The rate of technological change today is increasing exponentially. To provide a framework for our future modernization we are developing comprehensive Modernization Plans.

Modernization is a continuous, dynamic process, that must be guided by a cohesive set of plans. The Army Aviation Modernization Plan (AAMP) has been completed. Soon to follow are Armor/Anti-Armor (A3), Heavy Force, fire support, air defense, truck, command and control, and technology base modernization plans. The Army Technology Base Master Plan is an essential component of our other master plans.

The AAMP, which was approved by the Defense Resource Board in June 1988, is being used as a model in developing plans for the other mission areas. The AAMP looks 30 years out and provides a framework for modernizing aviation to correspond to advances in the threat, refinements in force design and warfighting requirements. The size of the overall fleet will be reduced from 8,600 helicopters today to a smaller, more capable force of about 6,600 helicopters by the end of FY94. Through the AAMP there are planned increases in production of all of our modernized helicopters. With the adjustments resulting from the amended budget, these quantities are: Apache (675 to 807), Black Hawk (1107 to 2253), AHIP (135 to 207), and CH-47D modifications (436 to 472). Additionally, Special Operations Aircraft will be built, safety and mission essential modifications will continue, and aging helicopters retired. The LHX, our light helicopter family of the future, is being developed, with RDTE fully funded through the Five Year Defense Plan.

The AAMP encompasses the entire RDTE and Procurement aviation mission area to include all aircraft, their associated systems and repair parts. Systems will be procured at their most economic rate within AAMP level funding and, where possible, through multiyear contracting. Through this integrated plan, short term solutions are avoided. Army aviation will enter the 21st century as a fully modernized combat effective force which will contribute unprecedented warfighting capabilities to the combined arms team. We want to use this comprehensive approach in all our mission areas.

Operationally, our RDA planning is guided by AirLand Battle requirements.

AirLand Battle Doctrine seeks to exploit the full potential of US and allied forces by synchronizing all available combat means to attain that end. Modern weapons have increased the lethality of combat to the point where the outcome of engagements between large mobile forces can be determined in minutes. History has confirmed repeatedly that a relatively small but potent force striking the enemy unexpectedly can destroy a larger force. Combat power must be rapidly concentrated in tactical engagements while simultaneously degrading the operational tempo of the enemy.

To ensure unity of effort, all three areas of engagement (deep, close, and rear) are considered interrelated parts of one battle. Deep operations shape the conditions in which future close operations will be conducted. Many of our key programs are designed to keep the adversary from bringing to bear their primary advantage of mass. Rear operations assure freedom of maneuver, continuity of operations, and uninterrupted service support. The measure of success of the deep and rear operations is the eventual impact on close operations. Close operations bear the ultimate burden of victory or defeat. The key elements which tie the total effort together and allow the combat commander to control his maneuver elements are his command, control, and communications equipment.

The combat value of our systems must be measured by their combined power which makes the sum of the parts greater than the individual contributions of the components. Conversely, our weaknesses can be seen in their true urgency in mission area context. For example, our Army now has the world's best tank and infantry fighting vehicle for mechanized warfare; however, they are currently being defended from the air threat by a 1968 vintage air defense gun. With the imminent fielding of the Forward Area Air Defense System (FAADS), our ground forces will be defended from that air threat by the world's best air defense system. These are the kinds of weak or strong links which make or break armies.

In developing the systems to support our doctrine we adhere to several principles to guide our efforts.

The Army has fully embraced the streamlining of the acquisition process from tailoring each system to fully complying with the Packard Commission recommendations and the derivative National Security Decision Directive 219. Our reorganization has resulted in a shortened and direct reporting chain for major defense acquisition systems. The three tier reporting chain for program management consists of an Army Acquisition Executive (AAE), Program Executive Officers (PEO's), and Project/Product Managers (PM's). This three tier reporting chain eliminates intermediate headquarters from the decision process and provides PM's with great flexibility to perform day-to-day activities on assigned programs.

The current PEO organization has been further streamlined to 14 PEOs and 1 direct reporting PM. In the original reorganization implementation there were 22 PEO and 3 independent PMs. The new structure consolidates PMs to allow better span of control and redistribution of assets within the acquisition community. The Army has incorporated the latest policy changes in the revised Army Regulation 70-1 (Systems Acquisition Policies and Procedures).

Streamlining the decision making process is allowing for better, more concentrated management of programs which will result in lower costs and more coherent, stable acquisition programs in the future.

Total Quality Management (TQM) is a key management initiative organized toward continuous process improvement activities in a totally integrated effort toward improving performance at every level. The TQM approach is to manage the processes which govern the quality and availability of goods and services rather than the more traditional approach of inspecting quality into the product. TQM capitalizes on such value added strategies and techniques as Acquisition Streamlining, Could Cost, Productivity and Reliability, Availability and

Maintainability programs. Every individual's contribution is actively sought to upgrade quality. Organizations which practice TQM are characterized by quality trained and motivated employees working in an environment where managers encourage creativity, initiative and trust, not large quality staffs! Our goal is to increase quality and productivity by making the TQM management approach an integral part of every functional activity in the Army - at all levels, in every organization, government and industry. TQM implementation promises long term productivity and quality improvement and better support to the soldier in the field.

DOD has defined acquisition as the conceptualization, initiation, design development, test, contracting, production, deployment and logistics support of weapons and other systems, supplies or services to satisfy Army needs intended for use and/or support of DOD missions. Efficient management of the acquisition process requires well-trained, broad-based and multidisciplined managers. To fill this need the Army Acquisition Executive developed the "Acquisition Management Mission Cluster Group." This Group will provide joint military and civilian oversight for the development, training and retention of the Selected Acquisition Managers who will support the Program Executive Officers, Program Management organizations and select participants from Matrix Support Commands. The Group responsibilities include acquisition career development policy, definition of training methods, career progression patterns, career tracking and inventory, and training funding to establish and maintain a broad-based, healthy inventory of capable military and civilian acquisition managers ready to serve at all levels of management.

MYP enhances program stability, encourages economic production rates, and saves money. The Army strongly supports multiyear contracting while recognizing it is not suited to every materiel acquisition. Budgetary flexibility is reduced when too large a portion of the Army's annual appropriation is tied to MYP. This affects our ability to respond rapidly to the evolving technology of potential enemies. The Army will continue to evaluate each potential MYP candidate, balancing advantages against constraints individually, and supporting multiyear acquisition strategy whenever possible. For FY90-91, the Army will submit the following MYP programs for Congressional approval:_ Bradley Fighting Vehicle System, Stinger (RMP), Stinger (Pedestal Mounted), Palletized Loading System (PLS), Family of Medium Tactical Vehicles (FMTV), High Mobility Multipurpose Wheeled Vehicle (HMMWV), PATRIOT, Abrams tank and multiple small arms.

We are also committed to competition. All major systems and components currently in development are reviewed early on in the acquisition process to minimize inhibiting factors and enable consideration of all reasonable competitive alternatives. The Army's Competition Advocate serves as the Army's spokesman for competition and maintains an active liaison with Congress, industry, the media and DoD/Army Competition Advocates. The Army exceeded its FY88 competition goal of 60 percent by awarding 61.6 percent of 33.8 billion available dollars competitively. Total procurement dollars awarded competitively were 18.5 billion out of a total 29.9 billion available for competition. Additionally, 93.2 percent of the contract actions were awarded competitively. Other significant achievements included a decrease in quality deficiency reports for the third year. This trend indicates that quality is not being sacrificed for increased competition.

The individual soldier comes first in all our RDA efforts. To that end we have instituted MANPRINT, the manpower and personnel integration program. MANPRINT focuses attention on manpower, personnel, training, safety, health hazard, and human factor engineering considerations during system design development, production and product improvement. The result is optimized performance of both the equipment and the soldier as integral parts of the system. Ultimately, this will reduce the demand for skilled manpower as well as the operations and support (O&S) costs associated with new or improved materiel. Using computer models which simulate both the human figure and the equipment, the total system design can be greatly refined even before prototypes are built.

MANPRINT results in positive innovations. For example, the T800 engine was developed for the LHX such that no special skills or tools are required to maintain it. Further, less than 10 tools are required by the user. Another example is the Howitzer Improvement Program where MANPRINT analysis led to reducing the crew from 5 to 4, and changes to the automatic fire control system that made it easier to use.

To sum up we are making a diligent effort to manage our RDA programs in a balanced, affordable way to equip our soldiers with the quality equipment they need to prevail in case of war. This is a definite challenge in a period of declining fiscal resources. The FY90/91 Amended Budget request is the product of difficult and lengthy deliberations. It represents our best efforts to provide a balanced program to equip the Army. We must buy and allocate our new equipment with sound business sense and optimum military rationale. Our major concern is that further reductions and economic instability will erode our ability to achieve that goal. It is a business axiom that it is futile to try to merely catch up to a competitor--you must leap ahead. Our present major procurement programs have achieved this quantum jump in performance capability. As our Army prepares to move into the next decade, our RDA goal is to continue that trend. As the Chief of Staff of the Army has noted, there is no substitute for the presence of forces on the ground as our nation's clearest symbol of resolve. The main determinant in our ability to achieve a successful transition into the 1990's is adequate and stable funding. Accordingly, we need the continuing strong support of Congress.

The **CHAIRMAN**. Thank you.

Let me ask a little bit of a philosophical question and then turn it over to the other members. I take it that what you did was, in fact, protect the R&D account and cut the procurement account. Can you give me the reason for that kind of rationale in todays world? Why would you choose that kind of mix?

THE R&D ACCOUNT

General **PIHL**. If you take a look at the threat, and it is emerging, and the increase of conventional forces quality as opposed to quantity, notwithstanding anything that I have read or has been said about the reduction of some conventional capability. It is the arrival of the modern systems, the future Soviet Tank 2 and 3, the Soviet HAVOC and HOKUM helicopters in aviation, they have a very robust air defense capability that tells us in the conventional forces they are going to be a smaller, tougher, more capable Army in the mid 1990s out to the year 2000.

We have taken a very calculated look at our budgets to make sure we preserve our current war-fighting capability and, therefore, have carried on production of the system, such as the M1, looking forward to product improving that to the M1A2. We have carried forward the Bradley Fighting Vehicle, the Black Hawk, ADATS air defense system, our communications command and control programs.

If you look at the $15 billion procurement program and the 700 million reduction, what we did was to take out an interim Scout Attack Helicopter. We kept the Apache program at 807 of the 975 we had originally planned to buy, and other than that, our procurement programs essentially stayed intact.

The reason we did not take any money away from RDT&E is because at the time we arrived in the mid 1990s, we have to have systems that maintain a qualitative edge over the threat, and we believe in that very strongly.

The **CHAIRMAN**. If I can get you to look beyond this current budget to the future and ask the question about where do we go with budget cuts in the future? Let's just assume that what is going to stay is the same. Obviously, if there is a big U-turn in the Soviet Union, all bets are off. A year from now you could postulate a situation where we would be in the same situation with the Soviet Union embarking on unilateral reductions, which we have to watch to see what happens but seems certainly less threatening. Arms control talks going on, but nothing signed yet, budgets of this country being driven down by the deficit, Gramm-Rudman threat of sequestration.

Given all of that kind of world of uncertainty, where the Soviets sound less threatening, maybe look less threatening but a lot has to be played out, you don't know where it is all going to go in 4 or 5 years. How do you manage the Army resources?

Let me broaden it just beyond the procurement and R&D to include the area of personnel, O&M and the readiness. I could make a case to protect the procurement and R&D and cut the operating accounts, the readiness and personnel on the grounds that maybe if the thing looks less threatening in the short run, you ought to keep up the procurement and R&D because we don't know where it is going in the long run, but make some force structure cuts or cuts, deliberate cuts in readiness.

Other people would argue, no, you have to keep up the operating accounts and you cut the investment accounts. Some people would argue you keep the procurement account, cut R&D, and others say no, the R&D is where it is going in the long run.

Give me a little bit of the philosophy which would apply, leaving out the particulars of the systems. What is the philosophy that we should look at in this time of change and uncertainty in the Soviet Union?

QUALITY FORCE

General PIHL. I think the most important point is to protect the quality of the force, and we have done that in terms of our recruiting capability and bringing in the same level of high school graduates and reduction of mental 4 categories down to the numbers we have been able to achieve, so quality we believe is what makes the Army come together and be the deterrent that it is.

Certainly you don't want an untrained Army, and so training is our second in that——

The CHAIRMAN. First of all, a good quality Army, how about a smaller Army?

General PIHL. Sir, I would say we did not increase our strength in the beginning of the 1980s, and the Army needs to carry out our responsibilities around the world. Since we did not grow during that period of time, I think force structure cuts would really endanger the amount of our capability worldwide. However, as we go through the various Defense Resources Board activities, we have been losing a brigade a year.

So while we start the process by not saying there is going to be a force structure cut, from our perspective we end up losing a brigade at each round. If you play that out over the next 10 years, that will come to a large amount of forces.

Having said that, quality first, then training, a trained and ready Army to carry out our commitments and then an Army that is modernized, and we made a fundamental policy decision to modernize the Army by thirds, so we are not going to try to swallow the whole requirement at one time. Our first-to-fight forces, those ten divisions that we have to have in 10 days into the heavy force theater where the threat is more serious, we will modernize by blocking out the improvements of our systems, making sure the first-to-fight always have the most modern system, and those who arrived at the war in later events will have the less capable systems.

Obviously, for the Army to get to war, we need sea and airlift and that is very heavy in our thinking. We do not have the budget authority to do that for ourselves. We are a customer of both those systems, but that force mobility is also very important to our future.

The CHAIRMAN. Where would you make the cut? If you are going to have to find the cut somewhere and you don't want to do it in the O&M account, you don't want to do it in the personnel account, you have to do it somewhere. Where is it going to go given the uncertainties and given what we see going on in the Soviet Union. What would be the philosophy of how you guys would implement these cuts? I understand you don't want to make cuts anywhere, and none of us do.

The question is Gramm-Rudman, even if we still are suspicious of Mr. Gorbachev, we have Gramm-Rudman forcing cuts on us every year. Then the question is: What would be your philosophy? Do you say that the thing that you really have to protect is the R&D because we don't know, if that will be the protection for the future? I mean, I can make an argument that war in the short run is less likely than war in the intermediate or longer run. It looks like it is pretty safe for the next year or two; the next 3 or 4 years we are not so sure, and beyond 5 years we don't know at all. So that would argue, yes, protect the R&D account.

It also might argue you could cut the readiness account or maybe cut the personnel account. I would like to know where you think, given lots of unpopular choices about where to cut, what would be your philosophy of how we ought to structure forces in this time of uncertainty?

Dr. SCULLEY. Certainly I do not advocate the mortgaging of the future, and, therefore, I have been, as has General Pihl, protective of R&D investment. That is probably one of the worse things that we could do for the country, is to allow technological surprise or a qualitative advantage to our adversaries. On the other hand, I see opportunities for savings in the O&M accounts through more reliable systems. We have been encouraging contractors through incentives in contracts for more reliable equipment.

The second source on the SINCGARS radio is probably the example that first comes to mind. There are similar opportunities in the development and fielding of training systems that in fact I believe have the opportunity to reduce operational while maintaining a comparable degree of readiness. I am not at all against readiness. I support readiness. There are alternate ways where I think we have barely scratched the surface to achieve it. I think there is gold in them there hills.

General PIHL. Sir, in terms of land power and the land combat responsibility and the allocation of resources, the place we have been in for 8 years has been third, and I would argue very strongly that land power and conventional defense post INF is something you would want to sustain.

The CHAIRMAN. Let's stipulate for the record that, yes, we need to maintain a strong Army and we will make all of the cuts, the efficient cuts, that we can. I mean, if it makes sense to do it, we will make sense to do it. The bottom line is, all services are going to get some kind of reductions, and efficient cuts aren't going to be enough to make the overall cuts from the budget processes in negotiations between the House and Senate.

I am still looking for some answers about what are your priorities. What would you—and just take those four areas, O&M, personnel, procurement and R&D, and put them in order of what you would protect first, what you would protect second, what you would protect third and what you would protect fourth over the long term. I am not talking this year's budget. Looking ahead and stipulating that Mr. Gorbachev looks like a good guy, but there is a lot of uncertainties. All right, what do you do?

FOUR BUDGET PRIORITIES

General PIHL. In the order of protection 1 through 4.

The CHAIRMAN. Yes, sir, one, two, three, four. Then you, too, Dr. Sculley.

General PIHL. As the appropriations director for R&D and procurement, I will be pleased to answer that question. Personal opinion, sir, I would protect R&D, then I would protect the operations and maintenance account, keep a trained Army, would protect sustainment and then finally would protect modernization.

The CHAIRMAN. Jay.

Dr. SCULLEY. I perhaps might switch the procurement with the O&M because I think there are ways to achieve readiness through improvements in the way O&M is done today. But R&D certainly first.

The CHAIRMAN. Then you would protect procurement second?

Dr. SCULLEY. Yes.

On the other hand, that is not to say that it should not be without a reduction. We don't have enough to do what we feel we need to do, yet I think in austere times you should have developed systems that are poised to go into production in the event of changes in the world situation.

General PIHL. Having made those ordinal priorities, I would like to remind myself out loud, readiness for the Army are troops configured in units delivered on time to the battlefield, and so in point of fact if the Army is faced with a reduction, we will end up taking parts of all of that, some training, some O&M, some R&D, and some procurement.

The CHAIRMAN. Got it. General Mallette, do you want to enter into this lottery?

General MALLETTE. Sir, they are doing fine.

The CHAIRMAN. All right. Bob Davis.

Mr. DAVIS. Thank you, Mr. Chairman.

I want to talk about a couple of programs, and I guess principally with General Pihl. I want to talk about the M1 tank, the recovery vehicle and where we are. We have talked to General Pihl many times about the recovery vehicle M88, and now, of course, you have recommended that we drop this.

I guess my question is: How do you expect to be able to recover tanks at any moment in time of war? You folks stress very strongly that you needed this type of recovery vehicle to be able to recover the tanks. I understand the budget constraints and that is probably why you did it, but I am concerned we are not going to be able to recover those tanks. Is the philosophy now that we will let the almost $3 million tank if one breaks down, we just leave it there? I know what you are probably going to say, we are going to use another tank to pull that tank. That is great if you are fighting a war in the desert where you can do that, but the wars aren't always going to be fought there. They are going to be fought in the hills and there is no way in the world you are going to be able to pull a tank up a hill with another tank.

How do you expect to do that, or is the tradeoff to say, we will just leave the tank there and take the loss?

TANK RECOVERY

General **Pihl**. Sir, our battlefield recovery doctrine has not changed, and we indeed have a difficult problem now facing a tank that is approaching 70 tons without a 70-ton towing vehicle. The reason we had the two candidates pull off, if you will, in a contest was to see if we could get a capable vehicle to handle that recovery problem.

We did not want to terminate the IRV program. When we got down to final authority, we did and we have taken some risk in that decision. Now particularly in peacetime, we are going to anchor the tank that is being towed with a vehicle to the rear and a vehicle to the front. We have also put out directions, safety instructions, to make sure that is adhered to as practiced in the field.

The battlefield recovery becomes an even more serious problem for us because indeed if you use a tank to tow a tank, you have taken another tank out of the battle. We are going to do a very modest fix, and that is to increase our tow bar capability in the fleet. Give everybody a more robust tow bar, the kind of things a recovery vehicle does in terms of maintenance don't change. We have a number of M88A1's in the field so we can pull packs, change engines and do the maintenance activity.

The real question is battlefield recovery. The most serious battle damage that I have seen—and I was in a tank battalion in Vietnam and was in charge of recovery operations for the year I was there—was a tank buried in the B-52 bomb crater. It took five M-88s to get it out of the hole. In an intense battle, I don't view us having the capability of doing that type of recovery. There are some we are going to have to leave behind.

To sum up, sir, we still need a recovery vehicle, but we are not prepared to buy one that did not meet our requirement.

Mr. **Davis**. How much money have we invested so far in the recover program?

General **Pihl**. I can get that number for you and put it in the record.

In terms of the M-88A2——

Mr. **Davis**. That is what I am interested in.

General **Pihl**. The recent program.

Mr. **Davis**. Yes, sir. If you don't have it now, just submit it for the record.

[The following information was received for the record:]

Recovery Vehicle

$30.3M has been invested in the M88A2 recovery vehicle program through fiscal year 1989, when the program was terminated.

Mr. **Davis**. I have some questions on the M1 tank as well, let me just ask a short one. I don't think I have used up that much time. Your proposal to close the Warren tank plant, am I right in my assumption that it will take, you are going to spend $30 million in this budget to start the wind-down of the Warren tank plant? Is that a correct figure?

TANK PLANT CLOSURE

General PIHL. There is $31 million in the request, yes, sir.

Mr. DAVIS. OK.

General PIHL. There is $40 million in 1991.

Mr. DAVIS. Does it really make sense to close the plant that is a Government-owned plant.

General PIHL. Government-owned, contractor-operated.

Mr. DAVIS. Does it really make sense to close that line down? Wouldn't it be better to have a program that kept both the Lima plant and the Warren plant open, even if you build less tanks at each one? Eventually we are hoping not to be building any more tanks, but perhaps we can find another use for the Army-owned or DOD-owned plant in Warren.

General PIHL. The ability to build tanks is a national capability obviously. The Army did not request the closure of the Detroit tank plant. As we sent our program forward and our program objective memorandum went through the proceedings in the final decision, the Defense Department directed that we close one of the plants and operate on a 516 tank a year basis, which is 60 short of what we need to economically run both plants.

So the difference is $139 million in fiscal year 1991 that we would need to buy the additional 60 tanks in order to operate both plants efficiently, and I think that would serve us well.

Mr. DAVIS. Do you have or could you have a contingency plan that you might submit to this committee that instead of closing the Warren tank plant, give us another idea, a better idea where you could keep the Warren plant?

General PIHL. Yes, sir.

Mr. DAVIS. You do have, you can have?

General PIHL. We will provide it.

Mr. DAVIS. Could you do that in a timely manner before this committee has to mark up?

General PIHL. Yes, sir, I can.

[The following information was received for the record:]

ARMY PROCUREMENT AUTHORIZATION

Our desire is to keep both tank plants operating at no less than the minimum sustaining rate of production. To accomplish this, an additional increment of funding would have to be added to the President's Budget request for the Abrams procurement program as follows:

	Fiscal year 1990	Fiscal year 1991	Fiscal year 1992	Fiscal year 1993	Fiscal year 1994
($M)	94.4	138.5	158.0	157.4	183.5

This additional increment of funding would allow continued production of M1A1 and M1A2 tanks at the two plant minimum sustaining rate and ensure execution of a follow-on multiyear contract. While such an alternative will keep both plants operational, it will result in increased unit cost since the Government will pay the additional overhead burden associated with keeping both plants operational at this minimum rate (48 per month) vice the historical rate of 60–70 tanks per month.

Mr. DAVIS. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. McCloskey.

Mr. McCloskey. Thank you. Good morning, gentlemen. I would like to talk about two or three programs, starting with the AHIP program. General, quoting your commentary here, you say, "Continuation of the AHIP program was simply not affordable. Termination of this program will leave the reconnaissance mission to older aircraft without a night and adverse-weather capability." You go on.

Can you give me the Army's feeling about the necessity of the AHIP, the quality of its performance so far? From the reading of your statement, in effect, you are saying we are going to have a very serious combat fighting deficiency, sir.

AHIP

General Pihl. The AHIP program is a superb configuration of the OH-58 into the D model with mast mounted site, able to fight at night. We have had a deployment of that capability to the Middle East and are very proud of its achievement. We wanted to buy 375 AHIPs and are now stopping at 207, based on the decision as to whether or not one wanted to continue to look at the LHX as the answer to Army aviation or stay with the AHIP in that role of reconnaissance and light attack.

Given that choice, we chose the LHX. We are now, of course, looking at the 207 AHIPs which perform both a field artillery and cavalry mission. One of our choices is to reconfigure those aircraft and put them into the cavalry units to solve our forward-deployed problems, but we fall short of all our aerial scout units getting the armed AHIP.

Mr. McCloskey. Who made a decision to terminate the AHIP? Was it the Army or Mr. Cheney? There has been reports it was Mr. Cheney, in effect, overruling the Army.

General Pihl. We tried to buy the AHIP back and were turned down.

Mr. McCloskey. Thank you very much.

General, one or two other areas. Can you comment on procurement of an item critical to Army aviation, the six model night vision goggles? There have been previous glitches, if you care to comment on that. I am very concerned a full contingent be out in the field.

NIGHT VISION GOGGLES

General Pihl. I am aware of your interest, and we certainly appreciate that support. Delivered to the Army, as of 1 January, were 894,728, we have a 3-year omnibus contract for 7,000 goggles in 1990. ITT, Litton and Varian will be the competitors for that. We have loaded the base for everything we believe they can build.

Mr. McCloskey. Is there any reasonable way to increase the production, say by a co-sourcing with another contractor, to bring another contractor into that?

Dr. Sculley. Yes, sir. We feel that there are. Just a little bit of history, we did in December of 1987 award another multiyear to supplement the omnibus competition that went in fact to ITT, Varian and Litton, and this minibus, as we called it, for the ANVIS-6 was, as I mentioned, awarded in December 1987, for a quantity of some 5,081 goggles, of which 1,159 are for the Army. ITT of Roanoke was competitively selected based on best value, and the contract is currently ahead of schedule.

In addition, the fiscal year 1990 omnibus contract is planned for award in fiscal year 1990 for approximately 37,000 of the PVS–7s and some 7600 ANVIS. ITT and Litton, Varian, and Optics Electronics Corporation, OEC, are expected to compete. By the end of fiscal year 1989, some 124,000 ground goggles and 6500 ANVIS will have been delivered to the Army. This translates to 40 percent of our authorized acquisition objective for ground goggles and 31 percent of the authorized acquisition objective for ANVIS.

Mr. McCloskey. What is your date now for full replacement, 1994?

Dr. Sculley. Because of the funding increases of some $7 million a year, the IOC for ANVIS will be reached by the third quarter of 1993 instead of the first quarter of 1994, sir.

Mr. McCloskey. Are you saying you are expanding it into other contractors' lines of productions as much as can reasonably be fulfilled, that you don't need any further help or backing, that we are on a maximum achievement schedule on this right now?

Dr. Sculley. I think we are, sir.

The original omnibus really just had the ITT/Varian team at 60 percent of the production and Litton at 40 percent. As I mentioned, we expect with ITT alone, in its Roanoke facility, Varian and OEC to compete, we will have broadened the base and delivered these articles sooner.

Mr. McCloskey. Thank you, Dr. Sculley.

One last question. The Army has canceled the fifth year of a 5-year contract for the 5-ton tactical truck program. Can you tell me if that will result in any gaps in production, and is this good policy? Is it a sound economic decision in the long run?

TACTICAL TRUCK PROGRAM

General Pihl. Cancellation from BMY's fifth year multiyear contract and gaps in production, yes, sir, it could occur.

Mr. McCloskey. How serious a problem will that be then?

General Pihl. Sir, if you look at all of the products and services we procure from Bowen-McLaughlin and York, that could be a serious problem for their truck Division.

Mr. McCloskey. Could I ask for a written statement as to the justification for that decision and analysis of the problems and gaps that are likely to occur, and perhaps we can get back and talk again on this before the markup, General.

General Pihl. Yes, sir.

[The following information was received for the record:]

Five Ton Truck

Cancellation of the 5th year of the M939A2 contract terminates production of M939A2 vehicles, and creates a 13 month production gap before start of the new FMTV production. It also results in a fielding gap of approximately 20 months between the end of M939A2 series fielding and the start of FMTV (new 5-ton) fieldings. The decision to withdraw 5th year funding was not an acquisition policy driven decision, rather an economic reality based on current and projected available funding levels for competing programs within the Army. The decision to not fund the 5th year also impacts the 4th year program by reducing that year's program by up to $4.7 million to cover cancellation ceiling costs that may be incurred. The potential impact in both the short and long run will be continued shortage of 5-ton truck assets within the Army, continued retention of overaged, maintenance intensive assets, and a delay in achieving the Army's procurement objective. The Army will gain economically in the long run by it's decision to proceed with the new FMTV due to its improved technology, fuel economy, and significantly lower sustainment costs. FMTV production will eventually modernize the Army's medium fleet it's procurement objective.

Mr. McCloskey. Thank you very much.

The Chairman. Larry Hopkins.

Mr. Hopkins. Thank you, Mr. Chairman.

Let me join my colleagues in their compliments of you earlier today, Dr. Sculley. You also mentioned there is gold in them there hills, and maybe we ought to be moving down the hall here with the Banking Committee, because your account is seriously overdrawn, and I am having a little bit of difficulty figuring out just where you gentlemen might be headed.

Now, on the one hand, your statement says that you have two "unparalleled helicopters" deployed in the Apache and Black Hawk, and you cite the devastating capabilities of the Apache. Yet here we are and here you are attempting to cancel some existing dependable helicopter programs to bank-roll and develop a new and more complex and technically risky aircraft called the LHX.

Now, I am wondering how you can possibly justify a $35 million attack helicopter program when we already have, in your words, an unparalleled devastating helicopter. So my question is: What is wrong with the Apache that requires that we build a brand new helicopter?

APACHE

Dr. Sculley. There is nothing wrong with the Apache in today's timeframe, and I think despite opinions to the contrary, it is the finest attack helicopter in the world, and I will stake my reputation on that.

At the same time, we need to look to the future. We have looked to the future in the aviation modernization program that I think is balanced between producing more of what we have in hand today and at the same time meeting and defeating the threat of the mid-1990s and beyond. I think the program has a prudent balance of existing with the new.

Our independent analysis on cost and operational effectiveness involving LHX, as done in-house, supported by the Institute for Defense Analysis and the Rand Corporation, clearly shows LHX to be a more effective, operationally effective and cost effective solution on the battlefield in the future.

Any development program has risks. I feel that a major piece of our responsibilities is to prudently manage that risk on behalf of the taxpayer and the Army, and I think that in fact we have done that.

Mr. Hopkins. What is the requirement?

General Pihl. 807 Apaches.

Mr. Hopkins. What requirement justifies the billions of dollars that it is going to cost to develop and build the LHX? What is that requirement?

General **Pihl**. Sir, in the 1995 to 2005 time frame, our ability to perform armed reconnaissance and light attack and to retire our Vietnam age helicopters, the Cobra and the DH-58 A&Cs calls for a new aircraft that revolutionizes the air calvary and attack battle field. We are looking for a 7,500 pound empty weight.

Mr. **Skelton**. [Presiding.] The gentleman's time is up.

Mr. **Hopkins**. I didn't know we had a time limit, Mr. Chairman. We have not been using it thus far today.

General **Pihl**. We are looking for a 7,500 pound empty weight. The only thing that doesn't go on the helicopter are the pilots and the $7.5 million fly-away cost in fiscal year 1988 dollars. The purposes for the LHX is to have a current capability in the year 1997 through 2005 in the reconnaissance and attack area. We will buy 2,096 of those and they will eventually replace the AHIP, Cobra, and OH-58 A&C. They will be a complement to the Apache.

Mr. **Hopkins**. The Army came in a few years ago and told us they needed a new truck. We had a truck that worked. The gentleman from Texas saved us from that dilemma and the trucks we now have are working just fine.

How much is the LHX going to cost, every dollar that you project to buy those 2,200 that you say you are going to need, how much will that cost per unit?

LHX

General **Pihl**. Sir, in procurement, $38.5 billion.

Mr. **Hopkins**. Per copy?

General **Pihl**. No sir, that is the total budget for 2,096 helicopters.

Mr. **Hopkins**. Are you prepared to stake your professional opinion on those figures and are you telling the subcommittee in 2 or 3 or 4 years from now the Army is not going to come back here and tell us a wonderful story why the cost of this LHX is going up again?

General **Pihl**. Sir, we have told both teams in demonstration and validation that there are two things, 7,500 pound empty weight and $7.5 million fly-away costs. If they don't meet those goals we will come over here and ask you to cancel the program.

Dr. **Sculley**. I think the track record with the development of the T-800 engine in fact is good news and has been developed within the budget guide lines. We expect to see that same performance through the development and production of the air frame and the mission equipment package.

Mr. **Hopkins**. Most of the funds are from the R&D account. I appreciate the gentleman's attitude in saying if it doesn't meet the goal, he will come here and say cancel the program. We all know what happens, the camel's nose gets under the tent and you cannot get it back out again. The time to seriously look at LHX is not after that happens, but now.

General **Pihl**. I understand, sir. In our deliberations we took a look at the AHIP and LHX for that combination role. We made sure that in disciplining the system we had a very firm understanding with our contractors as to what the cost history of LHX is going to be.

Mr. HOPKINS. Thank you.

Mr. SKELTON. Mr. Leath.

Mr. LEATH. Thank you. I share your frustration, I know you have had a hectic time the last few months. I have had a little of that myself in the Budget Committee. The Chairman almost threatened to fire me from this committee if we did not get the budget over with and back. I am glad to be back. I think Chairman Aspin's comments and line of questioning to you is right.

I think it is going to get worse before it gets better. I know that you are attempting to think through that. I was sitting last night reading your testimony and trying to get myself brought up to date and found that there are so many things that I would like to talk about with you, not criticize necessarily, obviously some criticism but more just to talk about.

So knowing we would not have the time I have done it so that I can submit it to you for the record. There are a lot of other things I do not have on here because I did not have time to get it together this morning and I would like to come over and visit with you about it.

Some of these decisions Chairman Aspin was talking about are absolutely vital to our long range planning. One of the things I have covered in my questions for the record here and I will briefly comment on some of these things and then perhaps ask a specific question, it is that I feel perhaps the same way that Congressman McCloskey does about AHIP.

I think it is one of the most cost effective, programs we have had. I understand the budget restraints but I think we have to figure out how to complete that program. I know as General Pihl said you tried to get it back and you could not. We have to work together and attempt to do that. I would like to see us go ahead and work toward a multi-year procurement with the Bradley because I think we can save money by doing that.

Even though we are in a time of budget constraints and likely to continue these cuts, we don't need to panic and lose sight of programs that can effect savings. I have some things in here with my colleague from Michigan, Mr. Davis, about the M1 tank and rethinking the practicality of closing that plant.

Also, General Pihl, in line with what I thinks some seven or eight Members of this committee discussed with you a few weeks ago, I think you need to rethink your position on this interim antitank weapon program. I think you need to rethink it from the standpoint of effectiveness to realize that we fully fund AAWS-M. I am very excited about that program. I think it will be one of the most exciting things we have done in a long time when it comes to fruition. But there is a gap in there and there is enormous concern in this committee about that gap. I don't think the Army has opened its' mind to it. I think some decisions have been made that are not good decisions in the area with the Dragon-2. I think you are digging your heels in. I think you should roll back in your rocking chair and think that through a little better. We have to work together, there is no need to have these contentious things come up between Congress and DOD. I would like to have time to talk with you about the FMTV program, the truck program in general, PLS, and all those things that I think are so vitally important.

When you can find a couple of hours on your schedule you will come over here late some afternoon, maybe I can bring some of Clem McKeska's barbecued ribs and a case of Lone Star and we can work this thing out.

Are you aware of the terrible tragedy that took place at Fort Hood. The Chief and General Powel and Congressman Murtha and I went down on Monday. I have been living in Texas all my life. That is the most freak situation I have ever seen from the standpoint of the type storm it was. Obviously, it is going to take months to determine what the damage is.

I don't think there is any question that with 25 percent of the total Apache inventory at risk, to some degree, we don't know at this point whether that means 15, 20, 30, 50, or 80 helicopters. Is this instance causing the Army to rethink the wisdom of shutting down the Apache production after 1991?

APACHE

Dr. SCULLEY. At this point it clearly is something that needs to be taken into account as we get in literally air frame by air frame to determine the extent of the damage from that devastating storm.

General PIHL. That is correct, sir. We have to look at all of our options. The good news is we have 23 Apaches on the ramp at Mesa. We have two battalions on route to honor our European commitments. We can get one over there in the summer timeframe.

It would be a choice for the Army to take the operational floats away from units and pool them at Fort Hood. We decided not to do that because we would change the readiness of all our deployed battalions.

Mr. LEATH. Pardon me, we got into that at great length, the Chief, I think, solved our problem there. I think we understand how we are going to do that. My question is: does this make us rethink what Larry Hopkins asked you?

General PIHL. Yes, sir.

Mr. LEATH. Does it make us rethink the multi-year we have laying on the table over there where we can probably save $420 million if we did it? As opposed to buying them 60 at a time, don't we need to rethink that?

General PIHL. Indeed, sir. The reasons for the other comment, in looking at what we might ask for in the emergency supplemental as opposed to fixing it on the back end of the Apache, we have some time and we will request that time.

Mr. LEATH. Thank you. I share your frustration and look forward to sitting down and talking about some of these things at greater length.

Mr. SKELTON. Thank you. Before I call on some others, Mr. Bustamante, files his questions to be answered for the record.

[The following information was received for the record:]

BRADLEY

Mr. Bustamante. How many Bradley Fighting Vehicles does the Army intend to buy? Please give a breakdown of how many are infantry and cavalry versions. What percentage of Army mechanized infantry battalions will be equipped with Bradleys?

General Pihl. The current procurement objective for the Bradley is 8,811 vehicles. The Army has procured through the FY 89 budget 5,464 Bradleys. The breakdown of the 8,811 vehicles between infantry (M2) and cavalry (M3) versions is as follows:

CONFIGURATION	M2	M3	TOTAL
Basic M2/M3	1384	916	2300
M2A1/M3A1	696	675	1371
M2A2/M3A2	3463	1677	5140
TOTALS:	5543	3268	8811

The percentage of Army mechanized infantry battalions that will be equipped with Bradley Fighting Vehicles once the procurement objective is achieved is 91.4 percent.

Mr. Bustamante. How many of the Bradleys to be procured under a multiyear contract would be M2A1/M3A1 versions?

General Pihl. None, the proposed multiyear contract for the Bradley procures only the current production model of the vehicle, which is the M2A2/M3A2. The M2A2/M3A2 configuration is the result of the survivability/vulnerability testing of the vehicle, which the Army testified to before the House Armed Services Committee on 17 December 1987. This version of the Bradley entered production with the FY 87 procurement contract for 662 vehicles. The Army started taking delivery in May 1988. The M2A1/M3A1 Bradley is no longer being produced. The last M2A1/M3A1 was delivered to the Army in April 1988.

Mr. Bustamante. How many of the Bradleys to be procured under a multiyear contract would be M2A2/M3A2 versions?

General Pihl. The Bradley multiyear contract procures 3,000 M2A2/M3A2 Bradley Fighting Vehicles.

Mr. Bustamante. What is the difference in price between the M2A1/M3A1 and the proposed M2A2/M3A2 versions?

General Pihl. The difference in price between the M2A1/M3A1 Bradley and the M2A2/M3A2 Bradley is $56.6 thousand dollars, on a unit cost basis. The M2A1/M3A1 unit production cost was normalized to reflect recent savings achieved in the limited competitive split buy for the TOW 2 Subsystem, which is common to both versions.

Mr. Bustamante. How many Bradleys would be procured under a multiyear contract?

General Pihl. The Bradley multiyear contract for the FY 90-94 period buys a total of 3,000 M2A2/M3A2 Bradleys, at an economic production rate of 600 vehicles per year.

Mr. Bustamante. What is the projected cost saving on a Bradley multiyear contract?

General Pihl. Total multiyear dollar savings are projected at $193.6 million dollars. This represents approximately 12 percent savings over a single year procurement.

Mr. Bustamante. How many Bradleys procured under a multiyear contract would be equipped with Reactive Armor?

General Pihl. All Bradleys procured under a multiyear contract would ultimately be equipped with armor tiles. These tiles may be either of a reactive or passive design depending upon the outcome of a competitive armor tile development program presently in progress. The Army will not proceed to a contract award on this program without notifying Congress of its intent to do so first.

Mr. Bustamante. At what date did the Army identify the "final" version of the Bradley design in order to initiate multiyear contract production of a single design?

General Pihl. The Army identified the final version of the M2A2/M3A2 Bradley in November 1988, when the 600 horsepower engine was approved for incorporation into the FY 88 production contract. First deliveries of M2A2/M3A2 Bradleys on this contract began in May 1989.

Mr. Bustamante. When was the report of the Army decision to "finalize" the design of the Bradley delivered to Congress?

General Pihl. The Army's report to Congress on its intent to produce the M2A2/M3A2 Bradley Fighting Vehicle System was delivered to the four Congressional Committees, Speaker of the House, and President of the Senate on November 30, 1987.

Mr. Bustamante. How many of the Bradleys to be procured under a multiyear contract would be equipped with a 45 millimeter combat vehicle armor technology rapid fire cannon?

General Pihl. There is no intent to equip any of the 3,000 Bradleys to be procured under the multiyear contract with a 45 millimeter combat vehicle armor technology rapid fire cannon.

Mr. Bustamante. How many of the Bradleys to be procured under a multiyear contract would be equipped with a version of a cannon firing 30 millimeter GAU-8/A ammunition?

General Pihl. There is no intent to equip any of the 3,000 Bradleys to be procured under the multiyear contract with a version of a cannon firing 30 millimeter GAU-8/A ammunition.

Mr. Bustamante. How many of the Bradleys to be procured under a multiyear contract would be equipped with a 35 millimeter Talon rapid fire cannon?

General Pihl. There is no intent to equip any of the 3,000 Bradleys to be procured under the multiyear contract with a 35 millimeter Talon rapid fire cannon.

Mr. Bustamante. How many Bradleys will be considered M2A1/M3A1 and how many will be considered M2A2/M3A2 when delivered from the production line?

General Pihl. None, the M2A1/M3A1 Bradley is no longer in production. The last M2A1/M3A1 Bradley was delivered to the Army in April 1988. The Army bought 1,371 M2A1/M3A1 Bradleys. All of these vehicles will be upgraded to the M2A2/M3A2 configuration.

Mr. Bustamante. How many M2A1/M3A1 Bradleys will be upgraded at maintenance depots to M2A2/M3A2 standards?

General Pihl. All 1,371 M2A1/M3A1 Bradleys will be upgraded to the M2A2/M3A2 configuration at Army maintenance depots.

Bustamante. How much will it cost to upgrade M2A1/M3A1 Bradleys to M2A2/M3A2 standards?

General Pihl. The procurement cost of the modification kit to upgrade an M2A1/M3A1 to an M2A2/M3A2 configuration is $260,008 (FY 89 constant dollars). The labor cost to apply these kits is estimated at $75,160 per vehicle.

Mr. Bustamante. Who will use M2/M3 vehicles that are not upgraded to M2A2/M3A2 standards?

General Pihl. Under the "first to fight" concept, the Basic M2/M3 Bradleys will be retrograded from Europe to U.S. based forces as the M2A2/M3A2 Bradleys are fielded to forward deployed and reinforcing units.

Mr. Bustamante. How will the decision to continue procurement of the Bradley to 8,000 vehicles impact on the proposed development of the Heavy Forces Modernization Family of Vehicles concept?

General Pihl. The continued procurement of Bradleys will have no impact on the proposed development of the Heavy Force Modernization Family of Vehicles concept. The procurement objective for the Bradley is 8,811 vehicles. The multiyear contract would allow the Army to buy up to 8,464 of this requirement. The last year of the multiyear contract is FY 94. the remaining 347 Bradleys would be bought in FY 95. The infantry variant (Future Infantry Fighting Vehicle) of the Heavy Force Modernization Family of Vehicles is not expected to start production until FY 99.

Mr. Bustamante. In the event the M113 series of vehicles is to be retained, which combat units will use those vehicles?

General Pihl. Once the Bradley procurement objective of 8,811 vehicles is achieved in FY 95, the only remaining combat units that will have the M113 as their infantry squad carrier and cavalry scout carrier will be the National Guard Divisions. It would take an additional 2,000 Bradleys to modernize that segment of the Army. It should be noted that fielding the Bradley to an infantry, armor, or cavalry unit does not eliminate the M113 Family of Vehicles from these organizations. For example, a Bradley equipped infantry battalion retains 23 M113 Armored Personnel Carriers for use by its medical, maintenance, and air liaison teams. Bradley fieldings also have no effect on the requirement for other M113 Family of Vehicle variants such as the M577 Command Post Carrier and the M901 Improved TOW vehicles.

Mr. Bustamante. Is it anticipated that the Army will develop and procure a version of the M2/M3 for such roles as mortar carrier, ambulance, command vehicle, armored ammunition carrier, etc. as is now the case with the M113 series of armored vehicles?

General Pihl. No, it is not anticipated that the Army will develop a version of the M2/M3 for such roles. However, it should be noted that the Multiple Launch Rocket System (MLRS) does use the Bradley chassis.

Mr. Bustamante. If the M113 series of armored combat support vehicles is to be retained in service, what will be the cost to maintain those vehicles compared with the cost to maintain Bradley based vehicles of similar function?

General Pihl. There are no Bradley armored combat support vehicles and therefore it is not possible to provide a comparable estimate.

Mr. Bustamante. If the M113 series of armored combat support vehicles are to remain in service with M2A2/M3A2 Bradleys, what modifications or upgrades will be introduced to improve their performance to more closely parallel that of the Bradley series of vehicles?

General Pihl. Due to affordability, there are no further modifications or upgrades planned for the M113 series of armored combat support vehicles.

Mr. Bustamante. If the M113 series of vehicles is not to be retained, why is the Army continuing to buy the M113A3?

General Pihl. The Active Army has not purchased M113A3s since FY 86. The Army National Guard and U.S. Army Reserves are currently procuring M113A3s, with dedicated Congressional funding, to fill critical shortages.

Mr. Bustamante. Will a foreign country provide the funds to upgrade the M2A1/M3A1 to M2A2/M3A2?

General Pihl. No foreign country is providing funds to upgrade Bradleys. Saudi Arabia, however, has signed an agreement to buy M2A2/M3A2 Bradleys. This agreement is for a total of 200 Bradleys, to be delivered over the FY 89-91 funded delivery periods.

HEAVY FORCE MODERNIZATION (HFM)

Mr. Bustamante. Please explain the rationale for continuing modernization of the M-1 Abrams instead of programming such funds for the development of vehicles and a new main battle tank under the Heavy Force Modernization concept?

General Pihl. Abrams Block II, M1A2, is necessary to meet the advancing ground threat and provides the bridge for the successful and timely development of the Block III tank that is part of the HFM Program.

Success of the Abrams Block II program is key to our ability to fight and survive on the projected battlefield of the mid 1990s. The Abrams Block II will provide our first-to-fight Armor forces with a fighting system that boasts improved survivability, lethality, and fightability at no decrement to reliability, maintainability, or availability.

The maturation of the technologies that provide the significant improvements of the Abrams Block II over the M1A1 will be incorporated into the HFM Block III tank. These technologies provide the stepping stones for the development of Block III tank. Without a robust Block II development and M1A2 production program, the technology, cost, and schedule risks for the Block III tank will increase from moderate to high.

In addition to the necessity for Abrams Block II to meet the threat and provide the stepping stone to Block III tank, there is a significant impact on the industrial base if we do not proceed as planned. Without Block II we can expect a loss of industrial momentum, expertise, competitive atmosphere, and investment. We will also be putting at risk the U.S. technology edge and signficant FMS opportunities.

Mr. Bustamante. If the Army accelerates the Concept Development of the Heavy Force Modernization, will funds currently earmarked for the M-109 HIP Artillery Improvement Program be reprogrammed for the Heavy Force Modernization-based artillery vehicle?

General Pihl. The funds currently earmarked for the M109 Howitzer Improvement Program (HIP) will not be reprogrammed for the Heavy Force Modernization (HFM) Advanced Field Artillery System (AFAS). The HIP addresses near term requirements and will provide the improved indirect fire capability we need until the AFAS is fielded in 2000.

There are approximately 2400 M109 Howitzers in the Army. Of those, 1700 will be upgraded to the M109 HIP and the remainder will be modified to the Reserve Components/Modified Armament System (RC/MAS). Under the HFM Program we will acquire 888 AFAS to be placed in Force Package 1, the 'First to Fight' force. When these AFAS are fielded the replaced M109 HIPs will be retrograded to take the place of existing RC/MAS Howitzers.

120MM MORTAR PROGRAM

Mr. Bustamante. Why has the 120 millimeter mortar program been put on hold? Isn't the mortar one of the most effective weapons available to the front line troops and the battalion commander?

General Pihl. The 120mm mortar program is not on hold. Operational Testing of the towed variant with nondevelopmental ammunition began on 22 May 1989 at Fort Lewis, Washington, and the carrier variant should begin testing during August. During Safety Certification Testing the Army had experienced problems with high blast overpressure in the carrier variant, and performance in extreme cold, with the nondevelopmental ammunition. Operational testing was delayed nearly six months pending resolution of those issues. Both problems appear at this point to have been corrected. Initial fielding is expected to occur during October 1990. The mortar is a key close combat system, since it represents the only form of indirect fire support organic to the maneuver battalion commander.

LIGHT HELICOPTER EXPERIMENTAL PROGRAM

Mr. Bustamante: How has the Army rationalized the replacement of over 2,000 UH-1 and OH-58 helicopters with only approximately 1,500 LHX helicopters?

General Pihl: The current procurement objective for the LHX is 2,096 aircraft. It will replace the older obsolete OH-58 and AH-1 helicopters in the light reconnaissance/attack units. The LHX is not a replacement for the UH-1 helicopter.

Mr. Bustamante: What is the current flyaway cost projection for one LHX aircraft compared with the UH-1H, the HH-60, the HH-60 armed with Hellfire missiles, OH-58D, MD-500/OH-6 helicopters?

General Pihl: The Unit flyaway cost for one LHX is $7.5 million in FY 88 dollars. Unit flyaway costs for the UH-60A are $5.3 million in FY 88 dollars and $6.1 million in FY 88 dollars for the OH-58D. The commercially produced (i.e., not to military specifications) MD-500, modified for military use, varies in unit flyaway cost between $3.5 million and $4.0 million for an anti-tank version. Since the UH-1H and the OH-6 helicopters are no longer in production, no unit flyaway costs are available. No armed versions of the UH-60 have ever been procured and no unit flyaway cost exists.

AH-1W AND AH-64A

Mr. Bustamante: What is the cost difference between the AH-1W and the AH-64A?

General Pihl: Based on the projected average flyaway cost for FY 88-89, the cost difference between the AH-1W and the AH-64A is approximately $2.933 million.

Mr. Bustamante: Under what circumstances can the AH-1W favorably perform the missions otherwise assigned to the AH-64A?

General Pihl: The AH-1W has a day anti-tank mission capability with the Laser Guided Hellfire missile relying on an external mode of Laser Target Designation. The AH-1W mounts only 8 Hellfire missiles as compared to 16 for the AH-64 and does not have an on-board Laser Designator. The AH-1W will also fire the 2.75 inch rocket for area suppression.

AIR DEFENSE ANTI-TANK SYSTEM (ADATS)

Mr. Bustamante. What is the current planned IOC for the ADATS Air Defense Missile System?

General Pihl. The current planned First Unit Equipped (FUE) date for the Air Defense Anti-Tank System (ADATS) is May 1993.

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Mr. Bustamante. What is the most recent drive-away cost projection for the ADATS Air Defense Missile System?

General Pihl. The most recent drive-away cost projection in fiscal year 1989 constant dollars is $7.5 million per fire unit.

Mr. Skelton. Mr. Spratt.

Mr. Spratt. General Pihl, General Mallette and Dr. Sculley, let me focus on Mobile Subscriber Equipment (MSE), it is my understanding this is a base-line program within Army procurement and the system itself is a NDI bought more or less off the shelf to your requirements.

MSE

Dr. Sculley. That is correct, sir.

Mr. Spratt. It is also my understanding that we have been experiencing some deficiencies in the systems delivered or at least in the systems being tested, namely that the system in the last test phase failed to complete 90 percent of the calls made, it only completed 74 percent of the calls made; is that correct?

General Mallette. Sir, the test that you are talking about is the operational test at Fort Hood this last summer. The reason or the issue you are talking about, we responded to back after the operational test. The call completion rate was indeed in the 74 to 82 percent range. The real issue was that contractually there is a grade of service specification, another term, another issue, in the contract that calls for a 90 percent grade of service. The issue was that we did not correctly or accurately measure grade of service during the testing.

Grade of service is an engineering design feature. It is a design in a communication system that the pipes, the switches, what have you, do indeed have the capacity to place, in this case, 90 percent of the calls.

We measured at the user end how many calls got completed. We did not measure the interior of the system, that is, the engineering design of the system. If I can give you one example, sir, because this has floated a couple of times. People mis-dial a telephone number. It is a digital touch tone system. If we have a user misdial, and he gets a response back and says, you put an incorrect number in the system, he hangs up, dials again and the system puts him through and he gets his called party. His call completion rate is 50 percent.

Mr. Spratt. That is an operator error. You don't regard that as a system error, do you?

General Mallette. No Sir, call completion rate is measured as the sum of all measures and says half the calls got through. For grade of service, and that is what contractually we were supposed to be looking at, for grade of service you should have gotten 100 percent because in the first case the system did what it was designed to do, recognized an invalid number, while in the second case, you gave it a valid number and gave you the subscriber.

Mr. Spratt. Is the degradation due to operator errors or system malfunctions or inability to handle the volume of calls it is supposed to carry simultaneously?

General Mallette. The system achieved 82 percent in testing by the user at Fort Hood and was judged as being an operationally suitable system.

Mr. Spratt. It includes operator errors as well as system errors?

General MALLETTE. Yes, sir, it includes operator errors, system errors, acts of God if you will, power failures or things like that. You factor out, of course, an obvious error that wipes out the system, for example, a truck runs into a tree, you don't keep running the test. You factor out the mishaps that would recount the numbers.

Mr. SPRATT. On April 7 Secretary Taft sent a letter to the chairman noting that recent testing has failed to demonstrate the original base-line requirement for grade of service. What did he have reference to there?

General MALLETTE. We did not measure grade of service. We measured call completion rate, 74 to 82 percent. What we have done since the FOT&E is entered into a contract modification with the vendor for a corrective action and actually modified the contract to verify the grade of service, not the call completion. This is now scheduled.

Mr. SPRATT. So you have changed the contract specification.

General MALLETTE. No, sir. We just put in stipulations that he will demonstrate to our satisfaction the original grade of service of 90 percent.

So the real issue, sir, was that we did not, we could not measure it through the mechanisms used at Fort Hood which were used to capture how many calls physically got through. That was not a valid measure.

Mr. SPRATT. Are there any other deficiencies in the system you are dealing with at the present time?

General MALLETTE. Yes, sir. The FOT&E operational test and our looking at the systems has come up with quite a number of things that we want to improve. It has come up with no serious deficiencies, though, that cause us to re-examine the way we are going or stop the program. We are looking at the secure equipment.

Mr. SPRATT. Have you cut down progress payments? Are you withholding obligations?

General MALLETTE. One, the hooks are there in that contract modification plan to do that. Second——

Mr. SPRATT. You mean you have now the contractual authority to withhold obligations if they don't?

General MALLETTE. We are withholding specifically for this 90 percent and other items. We also had that power in the original contract. Three days ago, I saw a letter from the contracting officer that had notified the vendor of a progress payment withhold. That is in there. The vendor has been notified that this process will be used until progress in correcting deficiencies has been achieved.

What we intend to do in March of 1990 is run the exact same test we ran at Fort Hood last summer to see what the grade of service is and, for example, the improvements in the crypto system.

Mr. SPRATT. By that time how much will you have obligated on contracts unless you withhold now?

General MALLETTE. It will be over $3 billion.

Mr. SPRATT. So you will have obligated most of the money on the contract by the time you start the next test?

General MALLETTE. Sir, we have done the test and the test has been successful. FOT&E has been successful. Again, we did not test it during the FOT&E as grade of service.

Grade of service is in the contract and we want to find out or verify that it is there. The correlation, and there is a lot of questions on this, the grade of service is the top rate that you are going to get. That is the engineering design rate of the system.

Mr. SPRATT. But it is a contract spec and a base-line program but you have a legal right to expect that it is attained?

General MALLETTE. Yes, sir and we have observed it hitting that rate. The official testing agency, when it went through all its recording, ended up with a variance between 74 and 82 percent. We have seen call completion rate hit at the 90 percent mark, the call completion, which tells you the grade of service design is there. We could not judge grade of service over a lengthy period by random events.

Mr. SPRATT. Let me turn to another item. I understand that you have about $250 million in inflation savings, that is to say there was money appropriated to account for economic escalation that has not occurred in the price of the program as of yet. That is a potential surplus and you plan to use that for the modification to the contract to purchase a new capacity for the system in data transmission. Is that correct?

General MALLETTE. The estimated inflation savings are at the $100 million level. But that, within the Army the agreement has been made that any money saved or money of this type within the MSE program will stay within the MSE program.

Mr. SPRATT. But is it going to be used for buying the extra sets for the late deployed divisions that are now getting cut out or to improve the specs of the system?

General MALLETTE. At this point the Army is not going to redirect the money to procure the two late deploying divisions. There is not enough money in it. It is about the same amount of money but we have obligated some of those savings because things like buying installation kits for POMCUS for Europe that were not originally in the NDI program but needed.

Mr. SPRATT. You might be able to squeeze out enough money to buy the two additional sets if you did not change the base-line specs, correct?

General MALLETTE. Yes, sir, and we would like to do that. A lot of these savings are engineering changes or proposals where things we originally thought were absolutely necessary, once we got it on the ground at Fort Hood said we really don't need that, don't give it to us and instead save that money.

Mr. SPRATT. There will be more of that coming also.

General MALLETTE. Yes, sir, we want to reinstate those two divisions. The best of all worlds is to be able to do it within the original funding profile generated from within.

Mr. SPRATT. Thank you.

Mr. SKELTON. Mr. Sisisky.

Mr. SISISKY. Thank you, Mr. Chairman. Welcome gentlemen. Mr. Chairman, I will yield for a moment because my line of questioning was going to be the same things Mr. Spratt talked about. I will yield to Ms. Slatkin.

Ms. SLATKIN. I would like to follow this issue on MSE with three quick questions, is the Government accepting equipment based on waivers and deviations? The equipment that you are accepting, are you accepting it under the waiver and deviation clause in the contract?

Dr. Sculley. I would have to provide that for the record.

General Mallette. From the grade of service aspect?

Ms. Slatkin. Yes.

General Mallette. I don't believe so, but we will get that for the record. As I mentioned before, we stipulated that it was not measured. We don't know, we have not stated whether it was met or not.

[The following information was received for the record:]

THE STATEMENT BELOW IS SUBMITTED AS CLARIFICATION TO THE TESTIMONY:

As previously stated, Grade of Service (GOS) is an engineering design criteria which cannot be directly tested, but its performance can be demonstrated through a very controlled test. It was determined that the test conducted to evaluate GOS during the MSE Follow-on Test and Evaluation, August — October 1988, were not adequately instrumented to provide an accurate assessment of the system's GOS. The test scheduled for January — March 1990 at Fort Hood has been divided into two unique tests. The first test is being designed and instrumented to assess GOS. The second test will be a repeat of tests conducted during FOTE and will be used to evaluate improvements the contractor made to the MSE system in the areas found deficient during FOTE.

The Army vitally needs the Option 6 (FY91) equipment, but funding the enhancements and packet switching are considered to be even higher priorities. Reduction in authorization for any of these funds will significantly diminish the Army's ability to accomplish its mandate to make needed improvements.

The original guidance provided by the Under Secretary of the Army for the acquisition of a tactical level Army Area Communications System was to select the best existing system "warts and all"; deploy the system to the field in the minimum amount of time necessary while not jeopardizing unit readiness; and correct system deficiencies through a preplanned product improvement program (P3I). OTEA and DOTE FOTE results, reported to Congress, mandated that the Army quickly make certain improvements, outside those for which GTE was/is responsible. Clearly, correction of these areas has priority for use of available program funds. Key factors which impact on the decision to use internal program funds are:

(1) Proceeding to Option 3 and 4 was contingent upon establishment and progress in the Army Corrective Action Plan

(2) The Army is using available program funds to accomplish these OTEA and DOTE mandated enhancements.

(3) Waiting for additional funds outside of the program would have meant delay in executing Option 3 and 4, and therefore termination of the contract with GTE.

(4) The Army decided to make the corrections as soon as possible rather than continuing to procure and field equipment that would require a costly retrofit effort. Some examples of FOTE deficiencies identified in the Corrective Action Plan are COMSEC, System Control Center upgrades, teletype replacement, sustainability, and training simulators.

(5) Many enhancement program items were budgeted or committed before the $277 million of FY 91 funds was taken. Approximately half the total projected enhancement funds have been committed or budgeted for these items.

With regard to the improvement of the system specifications by the execution of contract option for packet switching, the MSE program has always had a valid requirement for packet switching. Several Army studies, including a January 1989 study for Congress concluded that the ability of the tactical communications network to handle increasing data loads for the Sigma Star Battlefield Functional Areas (BFA) such as CSSCS, MCS, and ASAS in the post 1994 period required technological upgrades. GTE had submitted an Engineering Change Proposal in December 1988, which was a remarkable improvement over their original option package in the basic MSE contract. In the original contract, the cost for packet switching was $150 million and did not contain half the benefits of the ECP. It was an Army decision to not execute the original packet switching option. The ECP was a unique business opportunity for the Army. The option to accept expired on 7 April 1989 and future costs would have been considerably higher because more units would have required a comprehensive retrofit program in the field after production.

Not authorizing the full amount of FY 90 and FY 91 funds in the President's budget will mean that either corrections mandated by OTEA and DOTE will not be accomplished expeditiously, or else the packet switching network will be incomplete. The latter has an especially serious effort on warfighting ability, as brigades and divisions within the same corps would not be interoperable and would not be capable of rapidly exchanging Battlefield Functional Area (BFA) data, thus seriously affecting the intelligence community's All Source Analysis System (ASAS), the operational Maneuver Control System (MCS), and repair, resupply and administrative battlefield services through the Combat Service Support Control System (CSSCS).

MOBILE SUBSCRIBER EQUIPMENT (MSE)

General MALLETTE. Yes, the Army is accepting MSE equipment based on waivers and deviations from the grade of service aspect. An example of this is the radio which is a part of the Radio Access Unit (RAU) and Mobile Subscriber Radio Terminal (MSRT). The MSE radio unit must be accurately and adequately separated in frequency from other radio transmitter in the area. If they are not, the system suffers from the inherent frequency interference and reduces the potential call completion rate. The correction of this problem is a part of the contract modification and is to be completed by February 1990. In the interim, we are accepting equipment based on waivers and deviations.

Ms. **Slatkin**. I would like to follow up on that. On the issue of grade of service or call completion rate, is there agreement between the Army and the contractor as to what it is, how it is defined and how it should be measured?

General **Mallette**. As you know, the negotiations have been going on for the testing that is going to go on in February 1990, for the verification of the grade of service. We were down to the last few elements of agreement on the definition.

I would say we are at about the 95 percent rate as far as agreement on the definition. The definition comes down to the part of it that is going to be measurable, that is where the 5 percent area of non-agreement.

Ms. **Slatkin**. The last question then, how were you able to measure the operational test if you did not have agreement on one of the basic criteria, that is what is grade of service and how do you define it?

General **Mallette**. Number one, we did not measure it. We measured call completions. There was agreement on call completion. There was an understanding that proved not to be true later that you could extrapolate from call completion to grade of service.

In other words at the very simplistic level if you have a 90 percent call completion rate you had to have at least a 90 percent grade of service. When call completion rate fell into a lower rate, and the testers were unable to provide an agreed formula as to how to extrapolate from a call completion to grade of service.

Mr. **Skelton**. Thank you. Mr. Sisisky.

Mr. **Sisisky**. Thank you. Last year we wrote into the authorization bill to give you some impetus to work on some research on land mine detonation. Have you done anything?

LAND MINE DETONATION

General **Pihl**. Yes, sir, we have increased our land mine warfare research. We are now looking at armor anti-armor program as one of the capabilities. In looking at the various ways to take a threatened tank, we have moved our research area.

Mr. **Sisisky**. Thank you. I would like to be apprised of that.

Mr. **Leath**. [Presiding.] Mr. Ray.

Mr. **Ray**. Thank you.

Gentlemen, it is good to be with you today. General Pihl, during the last year the latest version of the Stinger missile has had some performance problems. Because of those problems, the Army has taken corrective actions including suspension of progress payments. You also subsequently established a 40 shot test program to determine if the missile meets its requirements.

I think that was a good move. It is always a good move in situations like this. I now understand you had decided the 40 shot test program met its' requirements and to proceed to procurement without the program, is that correct?

STINGER TEST PROGRAM

General **Pihl**. We will complete the tests of the Stinger. The issue is that there are 6,000 rounds standing up at General Dynamics, 5,000 are fully assembled and 1,000 are in parts. We are not going to sign the DD-250s and reward General Dynamics for that work until they have demonstrated that they have solved the software program so that version 13 of the software in the reprogrammable micro-processor will distinguish a helicopter target and kill it. In the last six to eight shots we have had a successful demonstration of that technology.

We must now take our recommendation that we could conditionally accept those missiles and I underscore the word "could" to the Defense Department and make sure they agree with our findings and also put the contract clause together that we will not fully pay General Dynamics unless they have solved the software problems.

One of the things was, does the Stinger perform better than most in the default mode. We have found that to be so. We are still working with the contractor to see that the software takes hold.

We have considered accepting those missiles but a final decision has not been made.

Mr. Ray. How many test shots have been done?

General Pihl. I believe eight.

Mr. Ray. So there will be 30 more to go.

General Pihl. Yes, we will be finishing that and also the pedestal mounted simultaneously and we have time to buy testing so we have three going on.

Mr. Ray. You are going to complete the remaining 32 test shots but you are going to take delivery before that?

General Pihl. In the bunker as those missiles exist they are better than any hand held in the world. We know that. The question is do we have enough data to conditionally accept the missiles subject to the fact that the final condition will be a complete rework?

Mr. Ray. Does that mean you are going to take them or not?

General Pihl. We have not decided. We are going to present the data to DOD. They will not advance the money to us unless we have demonstrated to their satisfaction that we have made that success.

Mr. Ray. Will you let the committee know when you have made a decision?

General Pihl. Yes, we will.

Mr. Ray. So no payment has gone forward?

General Pihl. That is correct. They are still the property of General Dynamics.

Mr. Leath. Mr. Rowland.

Mr. Rowland. In these difficult economic times you gentlemen have done a very good job in the balancing act of keeping R&D going to be ready for the future, maintaining a procurement schedule to maintain economies of scale and at the same time being assured we have not affected our readiness.

I compliment you on that balancing act. I would like to take a few seconds to understand our strategy on our modernization program for our helicopters. In your testimony you make reference to reducing the helicopter fleet from the existence of 8,600 today to a force of about 6,600 by the end of 1994.

That will be done by retiring Vietnam era choppers, obviously saving some money from repairs, spares and maintenance hours. In your testimony you make reference to planned increases in the production of all the modernized helicopters including Apache from 675 to 807, Black Hawks 1107 to 2253, AHIP 135 to 207, CH-47D from 436 to 472. I view this as a bridge to LHX.

Are these numbers realistic, is the plan realistic in view of the budget constraints and what is snags do you see with regard to that modernization program?

AVIATION MODERNIZATION PROGRAM

General PIHL. As you look at the assumptions that went into the December 1987 modernization plan, one as $3.587 billion constant funding. We recognize that is no longer a reality, aviation will be down to the 2927 level. Therefore, we turn back in the end of the Apache program and the AHIP. We still, however, believe if you look at the aviation procurement appropriation steady state at $2.9 to $3 billion level we can and must afford the LHX in that period of time it comes in.

Given the greater combat capability of that aircraft as well as the increased capability of Apache, our traditional unit mix inside a battalion has been reduced from 21 attack helicopters in a battalion down to 18 and then 15.

Part of the reduction is the increased lethality of that provision. Heads up, I would give in terms of aviation is the reality of the helicopter base. If in fact we are going to build a LHX and the warm base goes cold, then we are going to have a problem.

Mr. ROWLAND. In the termination plan AHIP would terminate in 1990, Apache would be 1991. What was the plan on the Black Hawks?

General PIHL. It continues on to 2200.

Mr. ROWLAND. 2253?

General PIHL. Yes, sir.

Mr. ROWLAND. That is pretty realistic?

General PIHL. Yes, sir, I believe so.

Mr. ROWLAND. One final thought. I have always regarded the budget determination process of the Pentagon, Army and the Secretary of Defense of course, the Congress as kind of a three-headed monster.

We have gone through the first two witnesses. Frankly, and sincerely, what congressional activities do you see pending now that would affect the thought out budget from within the Army and within the Defense Department that could derail some of these plans and I guess not just helicopters but the entire Army program bought short term and long term.

You can blame it on me by the way if you pick on some project.

Dr. SCULLEY. If revenues do not achieve levels projected on a national basis and with inflation out of control, these can severely damage what we can buy for the money. Those are two factors that worry me a great deal. I feel confident in our own cost estimates and projections that aviation modernization program even at the reduced level is something that we should and can afford within the Army as realistic.

I feel we have a solid hand on the costs and discipline necessary to achieve those goals.

Mr. ROWLAND. Achieving the economic projections and assuming the revenue and budget determinations for the next 4 or 5 years, what specific movements do you see from our side. For example, right now the theme of the day is that there is a contest between sticking with Mr. Cheney's budget versus add-ons.

There are $6.1 billion in add-ons being talked about. In that process I think many of us want to say if you are going to add-on something, you will have to take away from something else. With all the fights over the various weapons programs is there anything specifically out there that will derail some short term and long term plans assuming these economic conditions?

WEAPONS PROGRAM BUDGET

General PIHL. I think the answer is, if we look at the $1.317 billion in the Army budget that could be stuffed back in and we were asked to zero sum that on a bill payer basis it would unravel the amount of programs.

So the balanced budget we have put together now would become unbalanced for a period of time and then we would rebalance it to $1.3 billion, putting back the AHIP, putting back ATACMS, increasing MLRS rockets, keeping two tank plants open and buying the additional 60 tanks, restoring 1,400 HEMTTs, MLRS binary, keeping our plants open and restoring the ADATS.

If that were so I would have to take another $1.8 billion of Army programs to pay that bill. I think that is the answer to your question.

Mr. ROWLAND. Thank you.

Mr. LEATH. Mr. Kasich.

Mr. KASICH. Would you favor canceling LHX in exchange for continuing the Apache and the AHIP?

Dr. SCULLEY. Clearly not.

Mr. KASICH. Would you favor stretching out the LHX and delaying its buy or whatever; in exchange for continuing the Apache or the AHIP?

Dr. SCULLEY. Again, the Army would not prefer to do that. Our engine development already by some accounts is ahead of our air frame and mission equipment package. An overriding consideration is the capability to meet and defeat the threat in a time period.

Mr. KASICH. General, we on the Armed Services Committee feel as though for national security reasons it is necessary for us to continue the Apache and the AHIP. We think that without it we are really going to be hurting.

You have three stars, you are a military man, have you been in battle?

General PIHL. Yes, I have.

Mr. KASICH. I don't know how many guys up here have gotten to be a General, but let me ask you from a military point of view do you feel comfortable, do you feel as though we are strengthening the Army in its position in protecting its range by bringing on LHX and eliminating Apache and AHIP?

LHX VS. APACHE

General PIHL. We would be strengthened more if we had both but we were not able to afford that.

Mr. KASICH. So given a choice, you being a military man, I don't think military people want to be decision makers but I want your military thinking, you have the LHX over here and the Apache and AHIP here and I say, General, you are going to battle tomorrow, which do you want?

General PIHL. If they are both there in equal time?

Mr. KASICH. You have the choice of opting for the LHX or continuing the Apace and AHIP. Which would you take?

General PIHL. I would continue the LHX for a lot of reasons.

Mr. KASICH. Give us a couple.

General PIHL. First of all, it is the aircraft that will survive during that time. It is the light scout attack that will fight day or night. It has the capability that gives us almost the equivalent amount of hell-fires delivered on target.

By the time you have Apaches or AHIP, you will then have the capability you need. The HOKUM, HAVOC, FST-2 and FST-3, as you look at the threat of these aircrafts, $14 million for Apache and $7.5 for the LHX you can get two hell-fires more than you do for Apache.

Mr. KASICH. Let's say we decide not to trade LHX for these two systems. Let's say we want to have them all, we want the Apaches, the AHIP and the LHX. We want to go into the readiness funding the money that makes the tanks go forward and the training that makes the helicopters go right. We want to raid that because if we do we can take the money out of there and stick them into the other two systems. Would you favor that?

Dr. SCULLEY. No, sir, exclusively. I am on record of saying there are all the national means with today's technology to achieve similar levels of readiness. We have only scratched the surface of the training system. It is not that flight simulators are the total answer to flying training, they are clearly not but they are a major piece in training and hence contribute to readiness.

The same can be said for our conduct of fire trainers, training ammunition and other methods I think will be dictated by fiscal and environmental waves in the future to the way we train today.

Mr. KASICH. Are you saying we can dip into the readiness function and take money out of there to keep other lines open?

Dr. SCULLEY. I think in the future we can achieve similar levels of readiness for less money because of improved technology and improved training systems.

Mr. KASICH. So you would favor dipping into readiness and keeping the Apache and AHIP going?

Dr. SCULLEY. I would not translate that as dipping into readiness. I would improve the readiness through improved technology.

Mr. KASICH. You are for add-on of the Apache and AHIP. You would disagree with the Secretary of Defense on that issue is what you are saying.

Dr. SCULLEY. I don't think I have said that. I said I would prefer, given the choice to have the LHX program truncate, these are not cancellations. They are truncations of the existing programs for affordability, given that choice, I in fact would continue to support the LHX program.

On the other hand, if you look at Army aviation and the fact that it will spend in the neighborhood of some $3 billion a year over the next 5 years, it really spends at a rate less than a single program in the Air Force called C-17. The Army needs the C-17 program but I think it is healthy to put our total program in comparison with other aviation programs.

Mr. KASICH. I am very confused here. This is an important point. Marvin Leath and I both are on readiness. Are you saying I can call our staff director and say you can cut hundreds of millions of dollars out of the Army's readiness account? If we can do this, we will be happy here. People here don't want to truncate the program. If you are telling me we don't have to, then that sounds great to me. If you are saying, we can take some level of funding out of readiness that has been designated to the readiness accounts and use it to keep the Apache and AHIP program going, that is a fantastic revelation here.

Dr. SCULLEY. I think it is incumbent upon the Army or any defense agencies to look for improved ways to achieve the desired levels of readiness. Again, as I stated earlier, I think there are technological opportunities that could afford us those savings.

Mr. KASICH. You are saying we could take *x* number of dollars out of readiness and put it into these systems, yes or no.

Dr. SCULLEY. We are doing that. We are investing in the R&D account.

Mr. KASICH. In a couple of weeks we are going to mark up the readiness budgets. We will have *x* number of dollars. Then we are going to look at the Army budget. We will have to make a decision as to whether we will have to truncate the Apache and AHIP. So in a couple of weeks we are going to do this.

What I hear you saying to me is, if you want to cut Army readiness, we have the ability to improve Army readiness with fewer dollars, if you want to take these dollars from readiness and move them over into the Apache and AHIP account that is fine because we are able to achieve greater readiness with fewer dollars. That is what you are saying to me.

Dr. SCULLEY. Yes. There is an upfront investment to achieve it over the long term. We may be talking about the subject of readiness from two slightly different points of view, your responsibility on the Readiness Subcommittee and Program 11 versus the discussions here that are funded under Program 6. I am talking about the training and the operation and maintenance monies needed to achieve the desired levels of readiness, flying hour programs, optimum tempo for ground vehicles, I think, over the long term can be reduced through the insertion of technology.

Mr. KASICH. Mr. Chairman, I give up. I don't know what I am hearing here. I will give up and confer with staff to decide. You might have won this one. I don't know.

Mr. LEATH. As usual the gentleman is exciting, is he not? Are there any other questions?

Dr. Sculley, General Pihl, General Mallette, thank you. There will be some questions that the staff will submit for the record for you.

The meeting is adjourned.

[Whereupon, at 11:55 a.m., the subcommittee was adjourned.]

[The following questions have been submitted to be answered for the record:]

CHEMICAL DEMIL

Question: I noticed that a considerable amount of money was added to the Chemical Demilitarization program for FY90.

- Is this related to the so-called European retrograde?
- Why are we accelerating the funding for the movement of the European stockpile?
- If you begin moving the European stockpile, where are you going to put it? There is no room at Johnston Island until you begin destruction operations which have been delayed due to technical problems.

Answer: On 6 March 1989, Secretary of State Baker reported that President Bush had directed exploration of ways to accelerate removal of chemical weapons from the Federal Republic of Germany (FRG).

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Because withdrawal of these munitions was originally planned by the end of 1992, the Chemical Demilitarization program FY90/91 funding was increased to resource unfunded near-term FRG munitions retrograde requirements.

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OPERATIONAL VERIFICATION TEST AT JACADS

Mr. Hopkins. What is the status of beginning the Operational Verification Testing phase with toxic agent at Johnston Island?

--What's the problem?

--Does this delay the entire program?

--What if you encounter additional technical delays?

General Pihl. The Operational Verification Test (OVT) at the Johnston Atoll Chemical Agent Disposal System (JACADS) is now planned to begin in March 1990, approximately 7 months later than originally scheduled. The change in OVT is due to our underestimating the time necessary to fully prepare the plant for toxic operations. The additional 7 months will give us time to complete debugging the computer software that drives the equipment.

The delay in the OVT has resulted in a delay in the three fiscal year 1991 construction programs. Construction of chemical disposal facilities at Pine Bluff Arsenal, Arkansas; Anniston Army Depot, Alabama; and Umatilla Depot Activity, Oregon, is now scheduled to begin in December 1991. This will allow us to incorporate the OVT results in the designs for these facilities. The fiscal year 1992 design and construction programs are not delayed since the OVT results will be available prior to completion of the designs. The Tooele construction program is scheduled to continue with the JACADS OVT results being incorporated during a design verification period prior to completion of construction and start of systemization.

These program delays do not impact the projected completion date of April 1997. If additional technical delays are encountered, the program schedule will be reevaluated based on the type and magnitude of the problem.

CRYOFRACTURE

Mr. Hopkins. Why was the alternate technology cryofracture development program stopped in direct violation of Congressional guidance?

General Pihl. The Defense Department is aware of the Congressional interest in the cryofracture chemical demilitarization program. Given overall budgetary constraints, as well as uncertainties regarding schedules and the technologies involved, the Department of Defense determined last year that the cost of developing an alternative destruction technology (some $250 million) was not justified. The Army is confident, based on several years' experience, that the disassembly and incineration technology is safe and will meet our requirements.

EQUIPMENT TESTING - JACADS

Mr. Hopkins. I have read several reports on the tests done for the equipment to go into these chemical disposal plants which point to serious reliability problems.

--What is the status of the testing program for the equipment which goes into the first full-scale plant at Johnston Island (JACADS)?

--What happens if the disassembly equipment used in the JACADS plant proves unreliable or flawed? What happens to the overall program in light of the legal completion deadline?

General Pihl. The testing program for the JACADS equipment consists of individual equipment system testing at the Chemical Agent Munitions Disposal System (CAMDS) at Tooele Army Depot and final complete systems testing at JACADS. The systemization testing at JACADS is in progress and reliability test results are not yet available. Considerable testing has been accomplished and is continuing at CAMDS, and the results are considered good and are improving with continued operating experience. A summary of testing of the JACADS equipment at CAMDS is provided below.

The Multipurpose Demilitarization Machine (MDM), the Projectile Mortar Disassembly Machine (PMD), and the Bulk Drain Station (BDS) are undergoing reliability testing. The MDM and PMD are used in the projectile disposal process, and the BDS is used in the ton container, bomb and spray tank disposal processes. The following types and quantities of chemical munitions have been processed in the reliability tests:

Machine	Munition	No. Processed	No. Between Breakdowns	Availability Rate-%
PMD	105mm,M60	2,711	678	69.4
	105mm,M360	4,920	703	83.6
	8 inch,M426	466	233	84.1
MDM	105mm,M60	2,302	1,151	79.1
	105mm,M360	5,389	898	90.4

The resulting PMD availabilities were 69.4%, 83.6% and 84.1% for the M60, M360 (105mm) and M426 (8 inch) projectiles as compared to the design availabilities of 89.0% for 105mm projectiles and 96.3% for 8-inch projectiles. It should be noted that the design availabilities only consider failures which require repairs by personnel in Demilitarization Protective Ensembles (DPE's) and do not consider failures corrected by manual overrides. Although the PMD availability when processing 8-inch projectiles is lower than the design estimate, this does not represent a significant performance deterioration, given the small number of 8-inch projectiles in the stockpile, and will not impact either total processing time or cost for processing these projectiles.

In addition to the completed reliability tests, three additional PMD reliability tests will be conducted at CAMDS in 1989. The projectiles which will be processed during these tests include the M2A1 4.2-inch mortar and the M110 and M121A1 155mm projectiles.

The resulting MDM availabilities were 79.7% and 90.4% for the M60 and M360 (105mm) projectiles, respectively, as compared to the design availability of 87.2%. As indicated by the increase in mean time between failures and percent availability, significant reliability and availability improvement of the MDM occurred for the 105mm projectiles.

The reliability tests described above represent the first extended testing of the MDM, PMD and BDS. As such, the results represent the baseline of the machines performance. As each undergoes additional testing/operation during installation and systemization, the performance of each is expected to improve.

In addition to the disassembly equipment, the following major systems have been tested:

a. The M55 rocket system has successfully processed over 5,000 rockets with over 4,300 nerve agent GB filled.

b. The Deactivation Furnace System has successfully processed over 18,000 M55 GB rockets and in excess of 800,000 pounds of explosive burster charges from chemical munitions.

c. The liquid incinerator agent testing has included 37,900 pounds of GB in a one-third scale incinerator. A production scale liquid incinerator was employed to successfully destroy over 6 million pounds of mustard agent.

d. The metal parts furnace (MPF) has processed over 11,800 155mm projectiles, over 7,700 105mm projectiles and in excess of 5,800 ton containers. The MPF was also used to demonstrate incineration of over 7,800 pounds of nerve agent VX.

All indications are that the disassembly equipment that will be used in the JACADS plant will operate safely and reliably. If the equipment proves "unreliable," an evaluation would be made considering the achieved reliabilities and the impact on the entire program. In some instances a reduction in a disassembly machine reliability would have little or no impact on the overall program schedule because of redundant equipment in the process design and process limitations of other associated equipment, i.e., incinerators.

Mr. Hopkins. I understand that the test of one key component, the liquid incinerator, of the full-scale JACADS plant with GB nerve agent was a failure. My information is that the refractory lining dissolved and the salt removal system plugged up badly. I also understand that you do not plan on testing the corrections to this problem until you begin actual operations.

--Is this correct, and if so, how does this situation track with the numerous assurances to Congress and the public that chosen disposal technology is mature and reliable?

General Pihl. The JACADS liquid incinerator was shut down on April 25, 1989, because of excessive heat loss and high temperature around the secondary burner. This problem occurred while the furnace was operating on JP-5 fuel. Following the cool down period, it was determined that an opening had formed in the steel shell above the secondary burner. No GB agent has been processed in the liquid incinerator and none is scheduled to be processed until the complete incinerator system has been successfully demonstrated in the acceptance testing and plant systemization.

The problem was caused by a separation of the burner refractory tiles along the seams between rows of tiles, thus allowing hot gases to reach the steel shell. The separation was caused by the expansion and contraction of the tiles through the heating and cooling of the furnace and not by "dissolving" of refractory. There was no failure of the LIC salt removal system.

The burner block design has been modified, the replacement burner block installed and acceptance testing has been restarted. Extensive testing and nontoxic operations of the liquid incinerator will occur prior to commencement of toxic operations. In excess of 1,000 hours of nontoxic testing and operations are scheduled prior to initiation of agent feed to the liquid incinerator. This testing has always been planned and all systems will be tested prior to toxic operations.

COST OF JACADS FACILITY

Mr. Hopkins. What is the total cost to construct and equip the disposal plant at Johnston Island?

--Do these cost figures impact on the cost estimates for the U. S. plants?

General Pihl. The current estimate to construct and equip JACADS (to include operational verification testing) is $321.1 million. This does not impact on the cost estimate for the U. S. plants since the problems being encountered at JACADS are unique in nature. Additionally, lessons learned from JACADS are being transferred and incorporated into the plans for the Chemical Stockpile Disposal Program U. S. plants.

JACADS PROCESS CONTROL EQUIPMENT

Mr. Hopkins. I understand that most of the delays at Johnston Island result from problems with the process control equipment.

--What steps are you taking to correct this problem?

--Will you be using the same contractor and equipment which has caused the problem when you begin construction of the U. S. plants?

--Why not recompete that portion of the contract to see if you can get a better contractor?

General Pihl. Many instrumentation and equipment start-up difficulties are uncovered during the debugging of computer programs. It is not accurate, therefore, to refer to these problems as due to the "process control equipment." The process control equipment at JACADS has functioned as intended.

During the testing phase, three major activities are proceeding concurrently. They are:

a. Program debugging. Significant work has been on-going on debugging the computer programs which must be loaded onto the process control equipment. This effort is to be expected for a control system of the size and magnitude that is utilized at JACADS.

b. Instrumentation calibration. Work is continuing on calibrating the many instruments which input information into the process control system. Due to the extremely corrosive environment experienced on Johnston Island, many of these instruments have had to be repaired or replaced. In addition, adjustments or modifications to the instrumentation may be required based on information gained during start-up and testing.

c. Equipment start-up. As is to be expected during start-up of individual pieces of equipment, minor problems are discovered. Upon discovery, work is undertaken to correct the situation. This may mean modifying the equipment or the software program which controls that equipment.

In order to further minimize the testing and debugging time required at the continental U. S. sites, the same process control equipment that was procured, installed and successfully demonstrated at JACADS will be utilized at each continental U. S. site.

The original competition for the control system hardware contract included requests for the proposal from 21 contractors and receipt of six bids. The successful contractor was selected from the six bids and as noted above the performance to date has been completely satisfactory. This process control hardware is being demonstrated during equipment acceptance testing and plant systemization and will be fully demonstrated during the Operational Verification Test program. The Army has committed to the concerned public that the U. S. plants will employ the same, proven equipment that has/will be demonstrated on Johnston Island and, therefore, has no plans to recompete the control system.

AHIP

Congressman Leath. The amended FY90 budget cancels the AHIP after several years of healthy production. Army field commanders, particularly in Europe, have said that the AHIP fills a critical gap in our warfighting capability. The armed version which I understand played a key role in the recent Persian Gulf operations, adds to the AHIPs versatility and usefulness. The aircraft is in production and reasonably costed. Please comment on the performance of AHIP in a field environment?

General Pihl. AHIP field performance to date is outstanding. In addition to AHIP performing superbly at NTC and in Europe, the aircraft has also achieved high marks under actual combat conditions in the Persian Gulf and is still operating off USN ships there.

Congressman Leath. Have our field commanders commented on the aircraft's performance? If so, what have they said?

General Pihl. Commanders continually report that the AHIP provides our field a new dimension to the battlefield both as a day/night/adverse weather reconnaissance aircraft and as a survivable platform to adjust conventional and precision munitions. All AHIP's deployed to the Persian Gulf are achieving the upmost in safety and maintenance standards with a cumulative mission capable rate well above the DA standard while flying in excess of 5,000 hours.

At the National Training Center, the AHIP continually gives our commanders a significant new battlefield multiplier. As a reconnaissance aircraft, it identified threat formations at ranges exceeding 15 kilometers and enjoyed considerable success with target acquisition and remote designation of various "smart" munitions.

Congressman Leath. How do we justify canceling a program such as this?

General Pihl. The reductions in Army programs from President Reagan's Budget to the Amended Budget were significant. We lost AHIP because we could not convince OSD of its high, near-term payoff and high priority to the Army.

Mr. Leath: In a recent article in "Inside the Pentagon", there appears a letter from Army Secretary Marsh to Defense Secretary Cheney. The letter requests Mr. Cheney to reconsider his decision to cancel the AHIP. Did the Army try to buy back the AHIP?

General Pihl: Yes sir.

Mr. Leath: What was the outcome?

General Pihl: The alternative solutions the Army offered to OSD were not accepted.

Mr. Leath: Does the Army still want the AHIP?

General Pihl: The Army Helicopter Improvement Program (AHIP) would help rectify, in the near term, a significant warfighting deficiency, our limited ability to see the battlefield during day/night and adverse weather operations. It would also give us a head start in modernizing the force by being able to accelerate retirement of older aircraft. However, given the realities of the current fiscal environment it is more important in terms of our Aviation Modernization Plan to insure our future by fully funding the LHX program.

Congressman Leath. DOD has decided to terminate the AHIP program at 207 aircraft instead of the 375 envisioned in its aviation modernization program. What happens to today's Army warfighting capability, expecially at night, without the fully fielded fleet of OH-58D's?

General Pihl. With a total procurement of only 207 OH-58Ds, we will be able to meet our Field Artillery Aerial Observer (FAAO) requirements and field OH-58Ds to only two forward deployed cavalry regiments. This slows our force modernization and retirement of older aircraft and equips only a small part of our force to see the battlefield at night and during adverse weather. Fewer unarmed OH-58Ds mean continued reliance on the older, less capable, day only AH-1s and OH-58As in the interim 8-10 year period before LHX can be fielded in quantity.

ARMY HELICOPTER IMPROVEMENT PROGRAM AHIP

Congressman Leath. General Pihl, it is my understanding that the Hunter/Killer (AHIP/APACHE) concept is critical to the Army's warfighting capability.

Now that the AHIP has been canceled, what is the impact on that needed capability? Please include night operations in your response.

General Pihl. Without AHIP air cavalry, units will continue to be severely limited in their operational capability during periods of limited visibility or at night. This makes air cavalry incompatible with ground maneuver forces who are FLIR equipped. The loss of AHIP perpetuates the critical shortfall until LHX is fielded in the late 1990's.

APACHE HELICOPTER PROGRAM (AH-64A)

Mr. Bustamante: Earlier this week almost 25% of the total Apache inventory - nearly 100 aircraft - were damaged in a freak storm at Fort Hood. Is this incident causing the Army to rethink the wisdom of shutting down Apache production after the FY 91 buy?

General Pihl: The incident at Fort Hood did cause the Army to relook the situation of not curtailing Apache production after FY 91. After preliminary assessments it is clear that additional production Apaches will not be required beyond FY 91 to offset the disaster damage.

Mr. Bustamante: The Army has a multiyear proposal for the AH-64 on the table right now, and I don't think any of us believe it makes sense to stop building Apaches after 1991 - certainly not after the Fort Hood incident. We all know the Army is going to wind up buying at least another 240 to 300 Apaches. The question is whether we buy them 60 at a time and spend the $420 million. Please give me your position on this.

General Pihl: The decision to terminate AH-64 procurement after 1991 was dictated strictly by affordability decisions made within the context of a reduced changing defense funding posture. Procurement of 66 Apaches in each of the next two years would provide a total program of 807 aircraft which would field 40 battalions providing a robust warfighting force.

Mr. Bustamante: How is it that DoD can afford to maintain three separate fighter aircraft production lines while developing the ATF and the ATA, but it cannot afford to maintain the only anti-armor attack helicopter line in the free world while LHX is being developed? Given the increasing importance of anti-armor attack helicopters on the battlefield, does this seem like a logical allocation of funding to you?

General Pihl: The DoD allocates resources across the services based on overall defense priorities. The Army has traditionally received approximately 25% of the DoD budget. This percentage then becomes the Army Total Obligation Authority (TOA). In order to maintain other Army programs at a level commensurate with Army modernization, it was necessary to have aviation pay its share of the FY 90-91 reduction. The LHX is key to Army aviation future and is the centerpiece of the Aviation Modernization Plan (AAMP). It was necessary to protect this development, which meant that other programs would either have to be terminated or curtailed.

Mr. Bustamante: Doesn't good business sense and prudent risk philosophy dictate that the Army go ahead and enter a multiyear contract?

General Pihl: Yes, provided the proposed multiyear procurement contracts are desirable from the standpoint of sound economic procurement practice assuming they satisfy the various statutory requirements. No, if buying additional Apaches put at risk funding for other higher priority programs.

BRADLEY PROGRAM

Mr. Leath. The budget requests multiyear procurement of the Bradley Fighting Vehicle at a rate of 600 per year. I know there is some opposition in Congress to multiyear contracts on the grounds that they limit flexibility in the out years, but the Bradley multiyear is structured in a way that does not require the usual up-front money in the first year. This seems very innovative since it still delivers the required savings of more than 12 percent. Where does the Bradley multiyear rank in terms of importance to the Army?

General Pihl. The Bradley Fighting Vehicle has always ranked right behind the Abrams tank in importance to the Army. The 600 vehicle per year multiyear procurement fully supports the Army's goal of producing Bradleys at an economical production rate and operationally closing the fielding gap between the Bradley and Abrams by the end of FY93.

M1 TANK PROGRAM

This action is being proposed for reasons of affordability. Quite simply, the Department cannot afford to balance all programs - investment, manpower, etc., and produce tanks at the minimum sustaining rate required to keep both the Lima and Detroit tank plants operational. While the savings associated with the first few years of operation are low, in the aggregate, savings will accrue to the Department by layaway of the Detroit tank plant.

INTERIM ANTI-TANK WEAPON PROGRAM

Question: It is my understanding that the Army's report to Congress regarding an interim anti-tank weapon indicates the Army's intention to select Dragon 2 as the "most effective" system from among the candidates. Effectiveness as it relates to an anti-tank weapon means to me the ability to kill tanks and to survive to fire again. It is also my understanding that in calculating the kill capability for the Dragon for the purposes of this competition, the so-called "flinch factor" was not included. As you are aware, the Army, in its own documents regarding the Dragon, indicates that the probability of hit drops by 2/3 should there be any noise or stress on the battlefield. This significant reduction in hit capability is based on the fact that the soldier himself provides one leg of the tripod which is used for the stability of the system. Therefore, I would hope that since a soldier is likely to find noise and stress in battle your calculations for kill probability would be accurately reflected. Can you give us that assurance?

Answer: The "flinch factor" was not included in any of the probability of hit/kill calculations. As the March 1988 Armor/Antiarmor Study noted, the "flinch factor" (i.e., the disruption caused by significant blasts near a gunner in the process of guiding a missile) is a problem for all systems which require guidance by an antitank gunner. Each of the interim alternatives (Dragon, BILL and Milan) require such guidance (i.e., the gunner guides the missile to impact by wire) and each is susceptible to the effects of either direct or indirect fire near the ATGM position. Although the flinch factor has not been determined for either BILL or Milan in testing, similar affects should be expected.

Question: There also does not seem to be any importance placed on range of the systems in the Army's report. It appears that no importance is placed in the ability to fly over 900 meters in judging the merits of the competing interim systems. On the otherhand, range seems to be a very important factor in the requirement for AAWS-M since it must fly 2,000 meters. Would you please explain these differences.

Answer: The Capstone Operational Assessment prepared by the Army's Operational Test and Evaluation Agency (OTEA) did address range. Dragon's marginal effectiveness rating is atributed, in part, to its range, while the increased engagement range of both Milan and BILL is noted. The Army does have an AAWS-M requirement for 2000 meters because range is an important component of survivability. Other critical components include the ability to fire from covered positions, minimal launch signature and visual profile, rapid reload and displacement times and missile flight characteristics which do not contribute to threat detection of the system. BILL provides 2000M in range, but does not meet these other criteria. Further, in terms of a total system, BILL and Milan drawbacks include the lack of significant overall improvement in tank-killing ability, added crew requirements, poor portability (which means fewer systems and missiles can be carried to the fight) and the inability to employ the system with an individual parachutist. AAWS-M is significantly better in each of these categories than any of the proposed interim alternatives.

Question: As you are certainly aware, tanks try to use terrain and obstacles to their best advantage in hiding from the enemy. In addition, tanks in a defense position are virtually hidden from horizontal attack missiles. Again, I see no importance place on the ability to defeat tanks in hull defilade in your report when from an operation standpoint this seems to be of critical importance. Further, a top attack capability is specified for AAWS-M. Again, would you justify this apparent descrepancy.

Answer: The OTEA assessment and AMSAA analysis identifies the BILL's superior lethality vs. tanks in hull defilade. However, greater importance is placed on the ability to engage an attacking tank, which will present itself fully-exposed, as well as in partial defilade as it maneuvers. The AAWS-M requirement did not specify a top-attack capability, but the selected technology does provide top-attack in its primary mode, as well as a secondary direct fire option.

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Question: Survivability of the soldier is of the highest importance to the Congress. Since range and speed of the missile, in addition to being able to kill what you are firing at, plays a major role in the survivability to the soldier, how can the Dragon be considered the most survivable system when the other two candidate systems go twice as far with a missile speed twice as fast. How did survivability of the soldier play into your selection of Dragon as the "most effective" interim weapon?

Answer: Although all three systems (Milan, BILL, Dragon) were considered to be roughly equivalent in terms of gunner survivability, none is completely satisfactory. All have unacceptable visual profiles and firing signatures (blast, smoke, etc). None can be fired from enclosures. BILL and Milan's longer range and faster missiles, however, provide a margin of safety. These considerations, along with lethality, countermeasures performance, portability, reliability, cost and safety, were included in the Army's determination that Dragon was the most suitable and cost effective of the available alternatives.

MULTIYEAR (MYP) CONTRACTS

Mr. Aspin. The Army budget requests 7 new multiyear contracts to be authorized for fiscal year 1990 and 1991. Our analysis shows that, including programs with milestone authorization, your proposal for multiyear program would tie up more than 30% of the Army's total procurement account for fiscal year 1990 and 1991. This represents a significant increase as compared with the Army's recent history.

- What's your rationale for pursuing this strategy?
- How do you intend to deal with a potential lack of flexibility in the outyears if the Army must make further budget reductions?

Dr. Sculley. MYP, when feasible, enhances program stability, encourages economic production rates and saves money. Of foremost importance however, is the Army's ability to field the required blend of equipment the Army needs to combat the threat. As noted, having a large proportion of the appropriation tied up in MYP reduces the flexibility to provide this mix, especially in light of frequent resource reductions. The approximate 30% of the total Army procurement account for fiscal years 1990 and 1991 does not represent a significant increase compared with the Army's recent history, but does represent the most value in terms of needed Army equipment for the dollars expended. Senior Army management, after careful evaluation, has determined that this is an acceptable percentage and serves the best interest (tactically and economically) for the successful accomplishment of the Army mission. MYP is used wherever prudent to obtain the largest return for taxpayers dollars.

One method to assist in the MYP/flexibility issue is the placing of yearly options (plus and minus) in the MYP contracts. This would permit the reduction of quantities without breaking a MYP contract. Recent 10% (over existing contracts) and 12% (over annual) Congressional directed savings criteria, inhibits this initiative. Option reductions may bring the savings threshold below the Congressional criteria, thereby closing this reduction avenue.

Mr. Aspin. Finally, let's discuss the messages that you are sending to industry with multiyear contracts. I understand that you considered terminating the existing multiyear contract for Patriot missiles during the deliberations on the 1990 budget. I am told that this action would have cost considerable money in termination penalties. Why do you want to sign up for additional multiyear contracts that tie up even more flexibility in the future, if you were willing to discuss terminating existing multiyear contract?

Dr. Sculley. Decisions concerning what systems and how much appropriation is acceptable for MYP are made based on expected budget appropriation. Prudent planners allow for unexpected budget reductions which have become the norm rather than the exception. Not even the prudent planners however, foresaw the additional budget reductions directed by the President in the fiscal year (FY) 1990 amended budget. Initially Army management felt that these additional reductions could not be supported without absorbing funds from the PATRIOT MYP. While MYP benefits are important, they are secondary to fielding the proper balance of weapon systems. The Army found acceptable alternatives to meet our budget reductions without breaking the PATRIOT MYP. The Army has an outstanding record for not breaking MYPs which is supported by the high number of Contractors interested and willing to enter MYPs. The Army plans continued use of this acquisition strategy. Only extraordinary circumstances will necessitate the termination a MYP contract. Expanded use of yearly options explained previously, will provide greater flexibility in the future.

AH-64 APACHE

Mr. Aspin. Last year, the Army and Congress agreed to a multiyear contract for APACHE helicopters covering four years of production through 1994. Now, this budget proposes terminating APACHE after fiscal year 1991. Given that the budget assumes that the program will be terminated after 1991, what contracting options are available?

General Pihl. Single year Firm Fixed Price contracts.

Mr. Aspin. Assuming that all of the statutory requirements can be met, could the Army execute a two-year multiyear procurement that has severable options for the future?

General Pihl. A two-year procurement for the quantity of 132 APACHEs in Fiscal Year 1990 and Fiscal Year 1991 with options for future buys can be executed, however, the current statutory requirement for 10-12 percent savings would not be achievable on such a calendar limited multiyear.

Mr. Aspin. What might be required if you were to pursue such a strategy?

General Pihl. Significant relief from the Congressional savings criteria would be necessary prior to initiation of negotiations.

Mr. Aspin. I have heard proponents of continuing AH-64 Apache production argue the need for a warm attack helicopter production base until the successor LHX enters production; that reducing procurement program may mean some National Guard Units would not receive Apaches in the mid-nineties; and that potential savings attributable to multiyear contracting would be forfeited. These points seem both reasonable and attractive. Why is the Army no longer proposing to continue production of Apaches beyond 1991?

General Pihl. The Army is proposing to terminate AH-64 procurement after 1991 as a result of affordability decisions made within the context of a changing defense funding picture.

M1 TANK PROGRAM

Chairman Aspin. In recent weeks I've been hearing a lot about the proposal to close down a tank plant.

I'm told we have only two such plants; that Army requirements are unstable and significantly understated; that the Soviets continue to outproduce U.S. in tanks; and that little or no savings would result - we would simply exchange some numbers of tanks for plant closing costs.

If all of this is true, why are you proposing this action in this budget?

General Pihl. The Army was directed to budget for the layaway of the Detroit tank plant because, in its attempts to balance all Defense programs, the Department of Defense felt that continued operation of that tank plant was no longer economical. Analysis performed by the Army indicated that the burden associated with producing the same quantity of tanks at the Detroit and Lima tank plants vice producing at the Lima plant only is about one-percent of the annual program cost. In actual terms, this equates to $18.4 million in FY90 and $24.4 million in FY91 to produce the same quantity of tanks in two plants vice one plant. To maintain both facilities at the minimum sustaining rate of production in both FY90 and FY91, the total requirement is $1889.7 million and $1971.5 million respectively, or $94.4 million and $138.5 million more than in the combined Army and Marine Corps budget request. In times of decreasing budgets, and absent the existence of additional funded orders to meet domestic requirements, the Department of Defense felt it was best to lay this facility away. The Army's requirements for tank production, to include a limited surge capacity to meet wartime requirements, can still be met by continued production at the Lima tank plant.

V-22 PROGRAM

Mr. Aspin: Much has been said about the Army's recent withdrawal from the Marine Corp's V-22 Osprey program and the resulting impact on program costs. Please tell us what your participation has been on this program, and your rationale for withdrawal. For the record, when the Army make this decision?

General Pihl: The Army, under the direction of the Under Secretary of the Army, withdrew from the V-22 program in the early 80s based on cost, and narrow Army applicability (Medevac and Special Electronic Missions (SEMA)). During the construction of the FY 88 - 92 Program Objective Memorandum (POM) the Army put a funding wedge in its Army Aviation Modernization Plan to provide 231 V-22s. The subsequent rationale for cancellation was based on affordability and the narrow applicability. The Army has the UH-60 for air mobility, relies on the US Air Force for airlift, and the tilt rotor technology could not be scaled down for the reconnaissance/attack role. The Army officially made the decision to finally stop participation in the program in February 1988.

AHIP

Mr. Aspin: I've been hearing good things regarding AHIP's performance and reception by field commanders and was, therefore, quite surprised to find it would be discontinued by this budget. Is there a problem with AHIP that I'm not aware of or is this just an affordability issue?

General Pihl: The termination of AHIP was strictly an affordability issue.

MISSISSIPPI AMMUNITION PLANT

Mr. Aspin. I understand that the budget proposes to lay-away the Mississippi Ammunition Plant in 1990. Please provide us with the rationale supporting this proposal. And, please provide a status report on the plant's operation.

General Pihl. In 1988, during the Ammunition Hearings before the House Appropriations Committee, Defense Subcommittee, the Army outlined its plans to deactivate and layaway MSAAP beginning in January 1990. This difficult decision is based on the declining Army's budget, which necessitated the deferral of future buys of the M483 projectile in favor of other higher priority munitions.

Because of the unique design of this single product plant, as well as its high degree of automation to produce the M483A1, conversion to another product would not be cost effective. In addition, any conversion would affect the primary reason for constructing the plant - wartime mobilization and production of the M483. The easiest conversion would be to the M864 projectile. The government estimates it would take two years and $28 million.

MSAAP currently employs more than 1700 persons. Planned layoffs are:

DATE		EMPLOYEES	
FEB 90		359	MPTS
APR 90		412	CARGO
JUL-AUG 90		591	LAP, ETC.
	TOTAL	1,362	

MSAAP's production is getting close to schedule and they are loading approximately 19,000 M483 Projectiles a month. The facility contract is on schedule and will be 80 percent completed by the end of JAN 90.

M1 TANK PROGRAM

Chairman Aspin. The Army (OSD and Congress) will be expected to make a production decision on the Block II improvement without complete test information. Even with the mature technology present in some of the components, the system integration is new.

How much government or contractor testing of the prototype vehicles to be procured as part of the December 1988 full scale development contract will be completed prior to the July 1990 long lead decision? Prior to the production decision?

General Pihl. The test program is structured to consider not only testing on the vehicles, but also testing conducted in other areas such as labs, qualification, and simulation. It is essential to ensure adequate component testing is executed before

system (vehicle) level testing is begun. This will be the focus of early testing. In addition to component testing, 65 of the 165 total test months will be completed by the July 1990 long lead award date. By the production decision point, 142 of the 165 total test months will be completed.

Chairman Aspin. What is the effect of delaying a decision on procurement of long lead items for the Block II program?

General Pihl: The impact will be a delay of cut-in of the Block II configuration. The result of a delay in funding may not necessarily be a day-for-day slip to production, but is a function of the magnitude of delay.

Chairman Aspin. What testing will be needed after the production decisison is made?

General Pihl. Technical Manual (TM) Validation/Verification (VAL/VER) is required to continue after the production decision to support confirmation of changes stemming from developmental and operational issues.

The M1A2 tank program is supported by PM, Tank Main Armament System for the integration of Armament Enhancement Initiative (AEI) rounds which are not scheduled to be available until 1QFY92 and beyond.

An Initial Production Test (IPT) is being planned. The purpose of this test is to ensure that the transition to production has been accomplished effectively. It will also support resolution of any previous development issues.

Chairman Aspin. Does the high degree of program concurrency between prototype testing and production decisions allow enough time for correction of deficiencies identified during testing?

General Pihl. The test program has, to the maximum extent, been structured to address critical issues early in the test cycle. While this does not eliminate the program concurrency situation, it should increase the probability that deficiencies will be corrected during the test cycle.

Chairman Aspin. What assurances can the Army give that the performance of the M1A2 will be as promised?

General Pihl. The M1A2 Full Scale Development (FSD) contract is a completion-type, cost incentive contract requiring General Dynamics Land System (GDLS) to meet the requirements of the System Specification. The production contract will include First Article Testing at the component level and Initial Production Testing at the system level to ensure meeting the M1A2 performance requirements.

Considerable up-front analysis and evaluation has been conducted to assure that M1A2 performance requirements are realistic and achievable. These requirements will be met not through development of new technologies, but rather by integration of existing, proven technologies into a higher performance, inherently more survivable system configuration on the mature M1A1 platform. While new to ground combat vehicle usage, the standard data bus-based architecture selected for the M1A2 is mature, having been proven-out in multiple combat aircraft applications. The CO2 Laser Rangefinder will complete development under a separate, stand-alone program, in advance of its introduction into the M1A2 and the start of system level testing. The most complex of the mission equipment items, the Commander's Independent Thermal Viewer, represents only a repackaging of existing control system and thermal imaging technologies. Based on these considerations, the risk of not meeting M1A2 performance goals is low.

Chairman Aspin. Block II improved tanks are scheduled for production in 1992. This will be in the middle of the currently planned M1 multiyear contract.

What impact will this transition have on multiyear contract, especially in terms of design stability?

General Pihl. The next multiyear procurement will be based on the M1A2 tank with cut-in of the Block II changes by means of an Engineering Change contract modification. The improvements contemplated by Block II are essentially modular components that are either new or replace existing M1A1 components. The contract modification with cut-in vehicle effectivity date will be after the production decision. Production of the M1A1 tank will be continued until M1A2 issues have been resolved. If a portion of the Block II components (i.e., mission equipment) were to slip, those components could be integrated into production as the hardware design stabilizes.

ARMY AVIATION PLAN

Congressman Rowland. I note from your statement that the Army Aviation Modernization Plan will increase the number of Blackhawk helicopters from 1,107 to 2,253.

Could you explain briefly what factors went into this decision?

General Pihl. The UH-60 Black Hawk Helicopter Procurement Objective of 2,253 is based upon the requirements for Army Aviation as reflected in the Army Aviation Modernization Plan (AAMP). The AAMP restructures the Aviation force, resulting in a reduction in unit size, while maintaining combat capabilities with modernized airframes. The fielding of 2,253 UH-60 helicopters takes into account (a) an attrition of 4 airframes per year, (b) resourcing the Active, National Guard, and Reserve Component at full strength, and (c) Operational Float (ORF) and Repair Cycle Float (RCF).

Congressman Rowland. Over how many years would the procurement of the 2,253 Blackhawks be spread?

General Pihl. Current projections reflect the procurement of the UH-60 thru FY 2010.

AIR FORCE PROGRAMS

House of Representatives,
Committee on Armed Services,
Procurement and Military
Nuclear Systems Subcommittee,
Washington, DC, Tuesday, May 23, 1989.

The subcommittee met, pursuant to call, at 2:20 p.m., in room 2118, Rayburn House Office Building, Hon. Les Aspin (chairman of the subcommittee) presiding.

STATEMENT OF HON. LES ASPIN, A REPRESENTATIVE FROM WISCONSIN, CHAIRMAN, PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

The Chairman. The meeting will come to order this afternoon. This afternoon, the Air Force will testify on its modernization plans over the next 5-year defense plan.

In addition, the subcommittee will review the proposed recovery plan for the B-1B electronic countermeasures system and the deficiencies that that system has had.

Our principal witness is Lt. Gen. Ronald Yates, the Principal Deputy Assistant Secretary of the Air Force for Acquisition.

General Yates, I want to, on behalf of the committee, welcome you here this afternoon. Please begin and make whatever presentation that you want, in whatever form, and then we'd like to go into some areas that I know the committee has some interest in.

Prepared Statement of Hon. Les Aspin

This afternoon, the Air Force will testify on its modernization plans over the 5-year defense plan (FYDP). In addition, the subcommittee will review the proposed recovery plan for the B-1B electronic countermeasures system deficiencies.

Our principal witness is Lt. Gen. Ronald Yates, the principal deputy assistant secretary of the Air Force for acquisition.

Review of the revised fiscal year 1990 budget for Air Force procurement suggests that the affordability crunch has been postponed until fiscal year 1991. The major adjustment to the fiscal year 1990 budget is the $884.6 million cut in the B-2 program. This reduction reflects fact of life changes to the program.

Beyond that, however, there does not appear to be much change in the revised Air Force budget. My concern with this approach is that we may not be able to afford the Air Force programs as planned. Specifically, the assumptions made about real growth in defense spending after fiscal year 1990 and the use of multiyear procurements may not be realized. As much as we may want these plans to materialize, my guess is that we will be fortunate to see inflation covered in the future and possibly some but not all of the multiyear requests approved.

If this proves to be the case, I am concerned whether we will have prepared adequately to make what may be very significant and more far reaching adjustments than anticipated. It is important, therefore, for the Air Force to specify the priorities, requirements and planning assumptions that have been used to develop the fiscal year 1990-fiscal year budget plan.

With regard to the B-1B, the Air Force recovery plan is based in large measure on the use of expired or lapsed funds. As such, the Air Force contends that congressional action is not required for them to proceed with the ALQ161A core program.

My problem with this approach is that we are being asked to sit by while up to $725 million is spent on fixing part of the ERCM problem. This fix along with the $500 million that will be requested for a radar warning receiver to provide greater threat warning for the crew raises significant financial and policy implications for the committee. We will need to fully understand the Air Force's rationale. Also, in view of the General Accounting Office recommendation that the Air Force terminate the existing RWR contract, we will need to learn how the Air Force intends to proceed with that part of the ECM recovery plan.

I look forward to the testimony.

STATEMENT OF LT. GEN. RONALD W. YATES, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION

General YATES. Thank you, Mr. Chairman. I'm happy to be here.

With your approval, I'll submit my formal statement for the record.

The CHAIRMAN. Without objection.

General YATES. I have a few charts which I passed out to the Members, which I'll go through.

The first chart really shows the subject of today's hearing. The Air Force budget is 8 percent of the Federal budget. and today we're going to talk about one-third of that 8 percent—it's the Air Force procurement budget.

The first priority, obviously, is our people. But our remaining priorities for the budget, first, are to modernize our strategic forces, maintain a high level of readiness and sustainability, increase our airlift capabilities, modernize the tactical air forces, and increase of use of space in Air Force operations.

Chart number 2 talks about the adjustments that were made from the Reagan budget to the Bush budget, which we're going to discuss today. This I did at the request of the staff. These are the major changes. First, starting with aircraft procurement, you see that the major changes in fiscal year 1990 and 1991 were to the B-2, with about a $1.2 billion in 1990 and about a $3 billion in 1991. We decreased airplanes in 1990 by two and in 1991 by five.

Of course, that continues the low rate production in the B-2 program for an additional year. It moves some of the follow-on milestones further out, including the full rate production decision, and the required assets available date.

The next program where there was a major change is the F-15E. Now, when you look at that chart you see that in fact there's a plus up in 1991 relative to the Reagan budget, but the major change to the F-15 program was that our last year procurement will now be 1991, so we reduced the airplane buy by 78 airplanes over the FYDP and that took out about $3 billion over the FYDP. So the major changes in the program are after the two budget years that we're talking about, but within the FYDP.

There were minor changes to the SOF C-130s—minimum impact. There is a change to the MC-130H which realigns the funding for the radar depot from 1991 and it spreads that over 1990, 1991 and 1992.

There was a change to the F-16, and mainly that reflects the fact that in fiscal year 1989 we anticipated a multiyear procurement of

120 F-16s; in fact, the President's budget reflects 150. That changed the advanced buy requirements. In addition, there was a typographical error that had to get fixed. So we had some minor changes to the F-16.

In missile procurement and the Peacekeeper, about a $147 million reduction in 1990 and about $190 million in 1991. What those reflect is the deletion of the procurement of all the reentry vehicles, the fuses, and associated reentry systems for the second 50 missiles.

In addition to those dollars that you see there, which are only what is in the weapon system line, there were also initial spares deleted to the tune of $210 million in fiscal year 1990 and $150 million in fiscal year 1991.

There were changes in the space boosters. Fundamentally, that delayed the initial operational capability for our West Coast Titan IV Launch Complex from 1995 to 1996. Then as an offset to that we added a Centaur capability to an additional pad at Cape Canaveral.

Then the medium launch line, we reduced the procurement schedule for Delta II's and we did provide some funding for the Pegasus launch vehicle for R&D payloads.

Next slide, please.

I was asked to talk about multiyear procurement plans. Now, what I've shown here are the two multiyear procurements that the Congress approved last year—F-16 and DMSP. Then you see in fiscal year 1990 and 1991 we are asking to start six additional multiyear procurements. Now, of those six procurements, three are follow-on multiyear procurements. In other words, those programs have already had multiyear procurements. Of the remaining three, which would be new multiyears—combined effects munition, KC-135 and Maverick; two of those, the combined effect munition and Maverick, are multiyear buyouts. In other words, we've had head-to-head competition with the contractors. We now see the end of the program. We're going to a multiyear contract—winner take all for the remaining part of the procurement.

So all of those are very stable programs, as indicated by my remarks.

Of those programs which you see here, which we've had procurements on before, the Air Force has saved over $1½ billion. The average percentage savings on those programs is 12.3 percent. Of all the multiyears we've done, the Air Force has saved $4.1 billion. Obviously, we think this is a smart move for us. We appreciate the support of the Congress in this regard; we think it's good for the taxpayer.

Next slide, please.

Looking at those multiyear procurements which we would start in 1990 and 1991, I've listed here the savings. There's about a billion dollars of savings for those six programs. The average savings on those programs versus a series of annual buys is 11.8 percent.

Mr. Chairman, at this point I am prepared to discuss the other programs that we've worked with the staff so I will return the mike back to yourself and be happy to answer any questions you would have.

PREPARED STATEMENT OF LT. GEN. RONALD W. YATES

Mr. Chairman and Members of the Committee: I am pleased to appear before you to review the Air Force's proposed procurement activities for Fiscal Years 1990 and 1991.

Please note that the written statement I am providing today is based on the Bush budget.

The program outlined in this report is based on the United States Air Force Acquisition Program, which is designed to provide the systems and equipment needed by our Aerospace forces to implement our basic military strategy of deterrence in the most efficient manner possible. We continue to emphasize people as the first asset to develop and support. Our remaining priorities for this budget are

- Modernize strategic forces
- Maintain a high level of readiness and sustainability
- Increase airlift capability
- Modernize tactical forces
- Increase the use of space in military operations

This program has been formulated against a background of political and technological change of unprecedented magnitude. Soviet statements and proposals show remarkable reversals from past Soviet words and actions. Yet these statements and proposals are not yet firmly rooted as the types of freedoms we experience every day in modern democracies, nor have the Soviets translated the rhetoric into visible military reductions. In addition, General Secretary Gorbachev, though extraordinarily successful to date, is vulnerable in his own country to the consequences of failure. Therefore, we must base our military planning, as well as our development and acquisition of new systems, on the current capabilities of the Soviets, not their proposals or our own tendency toward optimistic evaluation of their intentions.

In addition to the Soviet concern, our neighbors in Central America, our friends in the Middle and Far East, in Africa and South America face challenges to their security that could result in a call for our assistance. In some countries of the world there is bitter hostility toward the US, demonstrated by both words and action in the form of terrorism. We must therefore be prepared to support our friends and protect our vital interests wherever they may be threatened. This demands the flexibility to participate throughout the spectrum of conflict, from low-intensity conflict to strategic nuclear war. That flexibility can not be created in one year or one budget. It requires a solid, continuing balance of readiness, sustainability and modernization, all applied to a sound underlying force structure.

The Air Force budget was painstakingly crafted to keep our aerospace forces on a stable, prudent course for ensuring US security, balancing current readiness and sustainability with future investment. The programs were chosen carefully to continue the modernization of existing force structure while using economical production rates and multiyear contracting to replace older systems. In our deliberations we sought a balance among required military capability, program priorities and budget realities. Our Air Force procurement programs support the budget priorities described above and are key to maintaining a deterrent force.

STRATEGIC MODERNIZATION

The Air Force strategic modernization program is focused on improving the land-based ICBM and manned bomber legs of the Triad.

The strategic modernization program, our number one priority, will ensure that our forces and associated command, control and communications are ready, sustainable and survivable to meet their peacetime and wartime missions. The Air Force responsibilities in this program are:

- Improvement of capability including accuracy, and reduction of vulnerability of land-based missiles
- Modernization of the strategic bomber force and their weapons
- Improvement of our command, control, and communication system

To meet these responsibilities, the budget continues the procurement of the Peacekeeper missile and development of the Rail Garrison basing mode for Peacekeeper. These ICBMs are highly reliable and provide a prompt and accurate response against hardened military targets. There appears to be general agreement that some form of mobility makes sense. The Soviet Union has already come to that conclusion and has deployed two mobile ICBMs, one on rail, the other a truck mobile system.

The Administration has recommended a stand-alone Peacekeeper Rail Garrison system and a Small ICBM in Hardened Mobile Launchers. Clearly both systems have their supporters and the Administration has recommended a program that meets US needs in terms of strategy, deterrence, arms control, cost, and support.

Updated short- and long-range missiles such as SRAM II and the Advanced Cruise Missile (ACM) severely complicate the Soviet defensive problem. These weapons greatly increase the bomber's area of influence while holding heavily defended, hardened targets at risk.

Bomber modernization, through deployment of the B-1B, assures our most versatile leg of the strategic Triad retains credibility while the B-2 Advanced Technology Bomber development and production program prepares to fill the long-term requirement. Continued modernization of B-52s and their transition to a standoff cruise missile role coupled with the deployment of the B-1B and B-2 maximizes the capability of these systems in today's environment.

Strategic defensive forces enhance deterrence by providing integrated tactical warning and attack assessment capabilities to detect, identify, and characterize attacks against North America. We are continuing to modernizate our ballistic missile and atmospheric warning systems, as well as upgrading our ability to process and disseminate integrated warning and assessment at the Cheyenne Mountain Complex.

The modernization of strategic command, control and communications will be pursued through programs such as the

Milstar system, the Ground Wave Emergency Network, and the Defense Satellite Communications Systems, among others. These systems complement one another. Together they provide high confidence our strategic C3 systems will survive and endure through all phases of conflict.

FORCE PROJECTION

The objective of force projection is to get a sufficient quantity of personnel and equipment to the right place at the right time. Resolution of our long-standing shortfall in airlift capability will be accomplished through the upgrade or modification of current systems and through the development and/or procurement of new systems. The C-17 is the key to our long-term program to reduce airlift shortfalls, especially in the area of intratheater delivery of outsize Army equipment. It gives three vitally needed capabilities: (1) approaches the minimum level of intertheater airlift capability recommended by the Congressionally Mandated Mobility Study, (2) provides the theater commander with outsize intratheater capability, and (3) offsets the capability lost as older aircraft begin leaving the inventory in the 1990s. It will be capable of all delivery modes: airland, airdrop (including outsize), and low altitude parachute extraction system (including outsize). This flexibility, coupled with life cycle cost advantages, makes the C-17 a vital element of our future airlift force. Increased reliability, maintainability, better operational utility, and minimized manpower requirements are some of the benefits provided by this versatile aircraft. Initial operational capability, with 12 aircraft, will occur in FY 92. The KC-10 Extender program enhances strategic mobility cargo capability while improving our refueling support for Navy and NATO fighters. Acquisition of the C-27A will provide a small, rugged, short takeoff and landing aircraft for US Southern Command.

TACTICAL AIR MODERNIZATION

We must remain capable of countering any conventional threat in a decisive, timely manner. Modernization of our tactical forces is being pursued through a number of programs. Given current budgetary constraints, to protect our combat readiness and sustainability while modernizing the force, we will draw down to 35 Tactical Fighter Wing Equivalents from 37. We will continue procuring the F-15E and F-16s, while developing the Advance Tactical Fighter and, with the Navy, the Advanced Tactical Aircraft. To maximize the capabilities of the force, the Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN) is being deployed, the improved performance fighter engines will be evaluated, and a variety of new munitions are being developed and procured. These new munitions will arm our forces with several new and improved capabilities in air-to-air and air-to-surface roles.

Modernization of our E-3 Airborne Warning and Control System will continue its support of our tactical forces. Equally important, though, will be maintaining the E-3 as a flag ship of the nation. We must ensure it is survivable, and capable of meeting the changing threat both as a strategic and a tactical resource.

To maximize the capabilities of our tactical forces, a variety of new munitions are being developed and procured. These new munitions will arm our forces with several new and improved capabilities in air-to-air and air-to-surface roles. AMRAAM is a high performance missile which will reduce vulnerability to our aircraft while attacking multiple enemy aircraft. Other air-launched tactical munitions include the Maverick air-to-surface missile, Tacit Rainbow emitter attack missile, HAVE NAP medium range precision guided standoff conventional missile, and HARM air-to-surface anti-radiation missile. Our tactical missiles increase combat effectiveness and aircrew survivability.

SPACE OPERATIONS

US forces increasingly rely on space-based systems for communications, surveillance, navigation, warning, and weather data to support operations in both peace and conflict. Consistent with national and DoD space policies, we will continue efforts toward assured mission capability, balanced against operational requirements and fiscal priorities. Our successful launch recovery program has seen the return to flight status of each class of vehicle that was operating at the time of the Challenger disaster - Delta, Titan, and of course, the Shuttle. We have also had the first flight of a new generation of expendable systems, including the Titan II and Delta II; and the Titan IV will be operational soon. looking toward the future, we are developing the Advanced Launch System family of vehicles which will provide responsive, flexible, low cost access to space. In our satellite systems, the next blocks of the Defense Support Program and the Defense Meteorological Satellite Program will continue to provide warning and weather data. Likewise, enhanced capabilities for our forces will be achieved with new capabilities such as the Global Positioning System of navigational satellites. Modernization of our strategic communications will be pursued through the survivable Milstar system. Our space systems will continue to be a keystone for support of both tactical and strategic missions.

READINESS AND SUSTAINABILITY

Ensuring our weapon systems can fulfill their mission requires appropriate numbers of trained operations and support personnel; sufficient levels of training and war reserve munitions; and adequate stocks of peacetime and wartime spares, repair parts, and equipment. In the current constrained fiscal environment, our best efforts are directed at optimizing readiness through improved training and balanced logistics support. For training, our most significant initiative continues with the development of the dual track pilot training system. For spares and repair parts, we are starting to lose ground as reductions in the spares account begin to affect 1990 and 1991 readiness.

SPECIAL OPERATIONS FORCES

Special Operations Forces (SOF) must be able to conduct a wide range of missions at all levels of conflict in order to provide the US with unique options where the use of large conventional forces would be premature, inappropriate, or infeasible. These forces are typically used to resolve crises and to terminate conflicts that are still at relatively low levels. The Air Force is procuring additional MC-130s and AC-130s; and upgrading H-53s to the MH-53J PAVE LOW "Enhanced" configuration.

The activities I've presented here today are part of a carefully balanced program. Sustaining efficient production and economical production rates can maintain the balance if stable funding backs it. We are committed to support these activities, and ask for your support.

Thank you, Mr. Chairman, for the opportunity to make this statement. We will be happy to answer your questions.

The **Chairman**. Thank you.

Ike Skelton.

Mr. **Skelton**. No questions, Mr. Chairman.

The **Chairman**. Norm Sisisky.

Mr. **Sisisky**. No questions.

The **Chairman**. Richard Ray.

Mr. **Ray**. General, on the SOF 130 mod reprogram, don't you have a reprogram in for that?

General **Yates**. I'm sorry, sir, which 130 program?

Mr. **Ray**. The SOF C–130, Special Operations aircraft.

General **Yates**. Yes, sir. The gunship or the MC–130, the Combat Talon?

Mr. **Ray**. Yes, sir.

General **Yates**. Yes, sir. What was the question, sir?

Mr. **Ray**. It's my understanding you sent over a request to reprogram some money into that—four of those ships that we lost due to——

Is it appropriate to discuss that in this hearing or should we wait for another time?

General **Yates**. Sir, we do have a request for congressional reprogramming of $125 million for fiscal year 1989 for the MC–130H.

Mr. **Ray**. All right, sir.

Some of that reprogramming is coming from Air Force payments?

General **Yates**. Yes, sir, it is.

Mr. **Ray**. OK. I was just out at Dayton, Ohio yesterday and they were telling me the woeful discrepancy in shortage in spares. How can we be asking to reprogram 50 million when we need a lot more money than that just to catch up?

You can submit all that for the record if you want to.

General **Yates**. OK, sir, I'll do that.

[The following information was received for the record:]

SHORTAGE IN SPARES

The $50 million reprogramming was against initial spares. Initial spares represent the first 2 years of requirements for peacetime operations. Any shortfalls will later increase replenishments spares requirements and risk a possible increase in the not mission capable for supply rates. Such an initial spares reprogramming is reluctantly done by the Air Force as a short term solution to meet a higher priority need.

Spares has been and remains a high priority item within the Air Force; however, there are higher priority programs. This reprogramming clearly demonstrates the Air Force's commitment to Special Operations Forces modernization.

Mr. **Ray**. The other thing is the KC–135. I understand for 1990 we are cutting the reengining from 50 airplanes to 25. Is that correct?

General **Yates**. I'll have to check that, sir. Give me just a second to check that.

[Pause.]

Mr. **Ray**. I guess the reason I'm raising that question is that this is a very cost effective program and to delay it at all creates a real costly situation, and the multiyear—it kind of kills the multiyear procurement of that program, as I understand, if we decrease the reengining 50 percent in 1990. I just want to raise that question with you. You can certainly submit any answer to that for the record, too, if you've got a problem with it.

General YATES. All right, sir, I'd like to do that.

Mr. RAY. All right, if you'd just check that out and put it back into the record.

General YATES. Thank you.

[The following information was received for the record:]

KC135

The Air Force requested 24, not 25, kits for fiscal year 1990. This request was based on a multiyear procurement. The savings associated with the multiyear procurement were reported in budget documentation but have been questioned by the GAO. This report is due by the end of September 1989.

The CHAIRMAN. General Yates, let me ask you to talk a little bit about the B-1 ECM problem.

General YATES. All right, sir.

If I could ask you, in your book turn to chart 30, I've got a presentation here, and if I can run through this then perhaps that will provide a basis for discussion.

These are the issues outlined in the presentation. If I could ask you to go to the next chart, chart 31, the core of the ALQ161 is to provide consistent supportable performance.

Now, "consistent" means that we want the system to react the same way against the same threat each and every time. "Supportable" means that we need a common configuration with all the planes, reliable operation. We want proper diagnostics through the integrated test set, and adequate support equipment.

The primary mode of operation of the B-1 is high speed, low altitude. As you know, it has a low radar cross section. So the first thing you want to do is see the threat and avoid it. You don't want to be turning the ECM system on unless it is a matter of last resort. Therefore, having the situational of awareness is extremely important to us—being able to see the threats so that in fact you can avoid them.

The problem with the architecture of the current system is that it gets overloaded in a high threat environment. Therefore, the Air Force has developed a plan to augment the "core" ECM system with an off-the-shelf radar warning receiver—the same radar warning receiver that would be in the F-16—the ALR56M.

What this will do, it covers the entire range of threats that we would expect to face and would enable the crew to see those threats and avoid them; so that's critical. I'll come back later on about the resources that that would require.

As far as the "core" development progress, the initial flight testing was completed ahead of schedule. The initial software release has been validated and verified—again, ahead of schedule. It will be released on schedule at the end of next month.

The tail warning function, which tells of approaching missiles, is also completed. Its FCA and PCA—again, ahead of schedule.

The other milestone is a system level preliminary design review—again, by the end of next month.

We will start retrofitting the tail warning function in July—that's on schedule.

The anechoic chamber testing of the first test airplane starts in July—and, by the way, the anechoic chamber just completed its isolation testing.

The final software release for the core development should be released in May of 1991.

So right now the schedule on the core system is progressing very well.

Next chart.

The ALR-56M, again, a plan is to install an Air Force common radar warning receiver. Now, this radar warning receiver is not integrated with the jammer, like, for instance, the current full up core system will be. For those threats which the core system detects it will jam. This radar warning receiver will not do that; it is to allow the pilot to have situational awareness to see the threat and to avoid it.

The information is displayed on the standard B-1 displays, and it's controlled with the standard B-1 controls, but it's not integrated with the jammer.

We expect it to meet our situational awareness requirements along with the core.

We have risk reduction studies under way. We have an installation study that we're funding with fiscal year 1989 dollars. We're doing that study in anticipation of congressional approval to proceed with the RWR program. That study should be complete in about this fall—October, November. We're taking pattern measurements. The install performance will be defined by the study that I just mentioned.

The B-1B RWR integration—that's what we're talking about in integration. This is not a development effort of an RWR. The fiscal year 1990 request is $46 million and the retrofit of that radar warning receiver would start in fiscal year 1993.

Next slide.

I think it's important because there's been an awful lot of discussion about B-1 capabilities to look just for a moment and talk about B-1 penetration capabilities. I've mentioned some of these things—the low altitude, automatic terrain following—we currently have the full capability and high speed .85 mach at low altitude. The navigation system is exceeding our expectations. It's more accurate, or less drift, at one-quarter of a mile per hour.

The radar cross section has been flight tested and does meet what we expected it to be.

Across the board, as far as range is concerned, we meet all the range specifications for all of the SIOP missions, and those have all been verified by flight test.

We have extremely accurate weapons delivery system. Again, the electronic countermeasures, as we were just talking about, today are limited—that's well-known. The "core" and the RWR are both required to complete our capability against the threat.

Now, when we have the "core" done, and when we have the radar warning receiver installed, we will be within 10 percent of our original effectiveness estimates for the B-1.

I'd ask you to look at the next slide. This talks about the terrain following system. The current performance is excellent. SAC is cleared to fly at 200 feet, mountainous terrain, day or night, hard ride. The fly-up rate is less than one every 80 minutes. The specification was one every 15 minutes.

The only thing that remains to be tested on the system is some very unusual conditions and in very deep snow—and I'm not talking about normal snowfalls; I'm talking 20 to 30 feet; and some sand dunes, and some unusual places in the world which have radar absorbing characteristics. That will probably take years to do. As a matter of fact, the F-111 isn't through with some of those unusual tests.

Mr. Chairman, I'd also add that the testing on the terrain following system has been completed with the ECM system operating, and there are no restrictions on operating ECM and terrain following systems at the same time.

Now I'm going to ask you to go to the next slide. This discusses the range of the airplane.

On this slide we're talking about—if you look at these ranges, in the lower right-hand corner you see the profile. This is the low level range of the airplane. It is all at .85 mach. It's all with the terrain following system operating. That's important, because the original specification said that we'd be able to fly 1,500 nautical miles at low altitude without terrain following. It was at .55 mach for 500 miles and .85 mach for a 1,000 miles.

The reason the terrain following makes a big difference is that if you have terrain following, then for safety reasons you have to be able to pull 2.4 G's for 10 seconds without any stall warning. Now, that can be difficult if the airplane starts at a very heavy weight. Of course, as the start weight is reduced, then, obviously, the range gets reduced.

So this says what our progress has been. When we started out in 1985, we went 1,300 nautical miles. For the first 18 aircraft without the stability improvement system, and you could see what their range is—a little over 1,700 miles.

Now, we currently have about 50 airplanes with SIS(2), which is a subset of the stability enhancement function. The testing on that will be complete within the week.

This summer, we will release the full SEF function to SAC; then they just throw a switch and start flying it. You see the low altitude range up there is almost double what the specification was under more severe conditions.

All of the airplanes—19 through the ship's number 100 will be retrofitted by June of 1990—so within a year. The first 18 are under retrofit now but those mods will not be completed on the first 18 until fiscal year 1993. So the range of the airplane is extremely impressive.

If I could ask you to slip to the next slide. This talks about the dollars. Now, the B-1 cost estimate—as the Chief and the Secretary have testified earlier in the year—is now $20.88 billion, which is over the cost cap of $20.5 billion. I'll talk more about that in just a second.

The $20.5 billion cost cap includes the "core". It includes all contractor over target estimates. It includes all undefinitized change orders. What puts us over the $20.5 billion is the next bullet on the chart, which is the radar warning receiver and/or—either one-the deferred depot support equipment. Those two raise the cap to

$20.88 billion—or raise the estimate to $20.88 billion; that's still within 2 percent of the $20.5 billion cap.

There are other improvements to be made to the airplane, which are outside of the $20.5 billion agreements that we originally established with the Congress.

We are adding new capabilities to the airplane. Fiscal year 1990–1991 has SRAM II integration, which was not originally planned.

We are doing research and development on some advanced expendables. So those are added capabilities.

Modifications, which are the way we ordinarily do business, those are mods for either R&M or commonality. In this case, anti-icing and some mods on the engines for early wear-out of shrouds and vanes are also included.

So that non-baseline FYDP investment is about $687 million.

Mr. Chairman, I'd add, that if you total all that up, through the FYDP, it's $1.43 billion. If I complete those programs, outside the FYDP, 1995 and on, I'd add on another $326 million. So the total would be $1.76 billion—not 7 to $8 billion. As stated by the General Accounting Office.

Sir, the last slide, we need your help on this, we need your approval, and the funding for the deferred depot equipment and the radar warning receiver program. We will need statutory relief for the $20.5 billion cap on obligations for baseline tasks. We need to raise that to $20.88 billion.

I'd also like to say that we won't exceed the $20.5 billion until fiscal year 1992. But our current estimate shows that we will exceed it by only 2 percent.

Sir, I'd be happy to answer any other questions on the B–1.

The CHAIRMAN. Let me ask a little question and then I'll let Ike and others ask questions.

Basically within the "core" program that you're talking about, staying within the $20.5 billion cap, what does the core program cost? Taking existing funds, what are we talking about—the total cost of the "core" program?

General YATES. What we have here is $476 million remaining but we have already obligated $50 million; so it's $526 million from expired/lapsed accounts and $199 million from active accounts for a total of $725 million.

The CHAIRMAN. Five twenty-six. I've got seven twenty-five.

R&D, 96; PME, thirty ten, there's five nineteen, and spares, 110; total, seven twenty-five.

General YATES. Mr. Chairman, I believe that seven twenty-five is the right number for the total "core" effort.

[Pause.]

The CHAIRMAN. This is information that you supplied us the last time we had the questions. These were questions for the record that I'm reading off of.

General YATES. I believe that's the right number, Mr. Chairman.

The CHAIRMAN. Unless it has changed from the time that you provided these——

General YATES. It hasn't changed.

The CHAIRMAN. OK, then it's seven twenty-five.

So the "core" program costs seven twenty-five, and now you're saying that you've got—the RWR program costs, I see four eighty-nine, and then another $250 million for support equipment. Where did that one come from? That's a new one to me. Support equipment.

General YATES. $250 million for deferred depot support equipment—$160 of which is for the ALQ-161A—we had to defer the depot support equipment from Rockwell, Boeing and Eaton because the technical baseline on the ECM system was not properly defined and because of congressional funding cuts, so we did not buy depot support equipment for the ECM system and some equipment from Rockwell and Boeing. So that was——

The CHAIRMAN. That's a new cost here. I've never seen that one before.

I get a grand total, to fix the ECM, of $1 billion 464 million. Is that your total?

General YATES. Yes, sir.

The CHAIRMAN. Approximately $1.4 billion—1.4, 1.5, billion dollars, and this gets us to an ECM which you say is still 10 percent less in capability than the thing we thought we were buying when we bought the B-1 back in 1981.

General YATES. Sir, I would have a different perspective on it. I say we complete the program, and we are $330 million over what we promised we'd complete it for, and we're 90 percent of the capability we told you we'd have.

The CHAIRMAN. General Yates, we're spending twice for the ECM and we're not buying the capability we thought we were buying in 1981.

This is a program that we signed with Eaton. Eaton signed a contract. I want to get into this contract, too. Here you've got a program that they were supposed to provide an ECM. Here we are—I don't know how many years later—no workable ECM out of Eaton.

So, according to what we're planning to do is we're going to go ahead and spend another 1.4, $1.5 billion, and we're going to end up with an ECM that is less good by 10 percent than the original promise—and 9 years later. That's the sum of what you're telling us here today.

General YATES. Yes, sir, that's the sum. I know that you know very well that we're not happy with that situation.

The CHAIRMAN. Not as unhappy as I am, I can assure you.

How you ever signed a contract with Eaton that allows them no liability in this thing. A contract was signed—two contracts—an R&D and a procurement contract, a lot of concurrency. Eaton wouldn't accept the concurrency, wouldn't accept the risk. You guys signed a contract that in effect gives Eaton no—no—responsibility; minimal responsibility, to perform on this thing—so we're buying it all over again.

General YATES. I think you put your finger on it. When the original contract was signed, it was a very, very concurrent program. You know that it is difficult in any concurrent program to get the contractor to accept unlimited responsibility for the outcome.

There was a plan for Eaton to accept up to $75 million to correct deficiencies by retrofit, but beyond that it was on the Air Force's shoulders. In fact, that's where we came today.

But we are not happy. I'm not able to sit here and defend what was done 9 years ago. In retrospect, I'd say that it was a mistake, clearly.

But I believe, Mr. Chairman, that given where we are today, we are doing absolutely the smartest thing for defense of the country and for the taxpayer.

The CHAIRMAN. Let me ask you this, because this is the key question that's facing us. We've got a very, very expensive B-2 program that we're also looking at, and we have 1.4, $1.5 billion to fix the ECM on the B-1. We're not going to be able to fund everything. We're looking at choices. I'm not saying that we're looking to a one bomber program, but maybe we're looking at one bomber totally capable.

I just don't see how we can continue to fund the B-2 at the rate that I look at those numbers coming in over the out years and pay this kind of money on the B-1.

General YATES. Mr. Chairman, I think the Air Force has—in looking at our defense responsibilities, has shown you where our priorities lie—we are recommending to you that you fund this program. We have made adjustments to the B-2 and other programs in order to make room for what we consider to be absolutely critical.

The CHAIRMAN. One of the adjustments you make is you want to cancel the Midgetman. In all of the programs that comes out over the years—the years in the Reagan years, since 1980—of the total amount of money that we're spending on all strategic programs, 60 percent of that is for bombers, 24 percent is for submarine and submarine launched missiles—they're all Navy programs—and about 16 percent is for missiles.

What in the world is the sense to spend 60 percent of our money—or let's put it this way, 84 percent of our dollars on the two legs of the triad, which, while not needing upgrading—or obviously needing some upgrading, they were not in trouble; we needed to upgrade the bomber leg, we needed to upgrade the seagoing leg, and we're doing that. But we're spending 84 percent on the two legs of the triad which needed upgrading and 16 percent, which back in 1980, on the leg of the triad—which back in 1980, was vulnerable.

What is the sense of the Air Force allocation of all this kind of money? What is the sense of any of this? I mean, yes, you've proposed a program. One of the proposals the Air Force proposes is canceling the Midgetman—the only really survivable land-based missile we've got.

I know that there's a bias in favor of bombers in the Air Force. But I don't see how we can continue to fund all these programs with this kind of an allocation. I don't see how you can continue to fund the B-1 program and say, it doesn't matter, it's too bad; we made a mistake 8 years ago and signed this contract and, gee, that's too bad; but let's come up with another 1.4, $1.5 billion; and in addition, there's this B-2 and all of that.

You all are telling us that the B-1 can penetrate for the foreseeable future into the Soviet air space. We're talking about improvements out into the future. We know that the land-based leg of the triad—the land-based ICBMs are vulnerable today.

Can somebody tell me why we want to spend this kind of money on this, that kind of money on the B-2, and not be spending more money on ICBMs?

General YATES. Mr. Chairman, we do think that even though your numbers are accurate, we think that we have a balanced system. Clearly the prime role of a bomber is deterrence in a strategic environment. It does add many of the things that I know you look for in terms of the small ICBM. It, in fact, can be dispersed. It is a non-threatening system. It can be generated to higher rates in times of crisis. All of those are some of the same characteristics that a small ICBM has, but it carries the largest warheads we have. It is the most accurate delivery system we have.

It is not restricted for operation in just a strategic engagement. In every war the United States has had in recent years, we have used the heavy bomber. So it is the most flexible weapon system that we have.

We think that what we've submitted to the Congress is balanced and recognizes those bomber advantages.

The CHAIRMAN. Thank you.

Ike, do you want to ask questions?

Mr. SKELTON. General, before I ask you a question, Mr. Dyson has a unanimous consent request, I understand.

Mr. DYSON. Mr. Chairman, I'd like to offer a question for the record and have the General submit his reply for the record. It's unrelated to what we're talking about, and I also have to leave—so if we could do that, Mr. Chairman.

Thank you, Mr. Skelton.

[The following information was received for the record:]

MORTON THIOKOL

On July 1, 1989, Morton Thiokol will have a corporate breakup. The new companies will be Morton International, Inc. and Thiokol Corp. While this may be a very wise corporate move that we will admire in the years ahead, I am concerned about the possible adverse impact that this action may have on existing Air Force contracts and on the nation's defense production base.

According to the company's preliminary estimates, Morton International will have $45-50 million in long-term debt, which is only 12-13% of its total capital. In comparison, Thiokol will end up with $200-220 million in long-term debt, which amount to 36% of its total qapital. In view of Thiokol's near total dependence on NASA and military contracts and the federal budget's tightening constraints, I am concerned about the future viability of Thiokol in the mid to late '90s.

I realize that Morton Thiokol's Aerospace Group makes a number of propulsion systems for the MX missile, the Sidewinder, the HARM missile and other important weapon systems. I also understand that Morton Thiokol is involved in various ordinance advanced development activities which will lead to the future Air Force small ICBM of the 90's. In addition, the Aerospace Group's STAR orbit insertion motors have placed about 90% of the country's scientific, commercial and military satellites into orbit. It also provides propulsion systems for upper-atmospheric research and anti-satellite systems.

Question: My question, is how will the Air Force ensure that Thiokol is able to meet its contractual obligations after the corporate split?

Answer: In the space launch area, Thiokol is a second tier vendor for caster motors on the Delta II launch vehicle and the Star motor used on the Delta II as well as the Payload Assist Module DII used for Shuttle launch. The Prime contractor on these systems will be responsible for assuring their vendor meets its contractual obligations.

Question: Also, how will this split and the heavy debt incurred by the new Thiokol Corp. affect current and future Air Force programs?

Answer: In the space launch area, the prime contractor on Delta II launch vehicle is developing a new higher performance caster motor (Graphite Epoxy Motor - GEM) that will replace the Thiokol produced caster motors. The Air Force is no longer planning to use the Thiokol Star motor on the PAM D-II. Thus, the risk of business failure at Thiokol poses a minimal threat to Air Force Space systems.

Question: Because of the Aerospace Group's expertise in propulsion systems and rocket engines - and the understanding that it can take years to certify a company to build these engines - will this breakup hurt the military in the mid or late '90's?

Answer: There are several suppliers of these types of motors that remain viable in the United Stated: Hercules, Aerojet, United Technologies and Lockheed. Also, it is not clear that Thiokol will fail as a result of this reorganization. The Air Force believes that the commercial market and the civil space program, as well as military demand, is adequate to maintain an viable industrial base in solid rocket motor production.

Mr. SKELTON. General, I've been listening to you and what you say is Air Force Ecze, which country boys have a difficult time following, so let me ask you some basic questions and try to answer them in English, if you can.

Right now we have how many B-1s?

General YATES. Ninety-seven.

Mr. SKELTON. They are all flyable, more or less?

General YATES. More or less.

Mr. SKELTON. What do we have as of this moment? We make a decision, no more money for the B-1; what do we have right this minute insofar as penetration, electronic system, and the works, right now?

General YATES. What do we have?

Mr. SKELTON. What do we have?

General YATES. We have, as far as penetration is concerned, we have a bomber which exceeds our range expectations, which flies high speed, low altitude; has a reduced radar cross section. It has deficiencies in being able to detect and avoid threats, and its jamming capability is limited.

Mr. SKELTON. With the exception of the jamming capability, is everything that you listed what you bargained for?

General YATES. Yes, sir.

Mr. SKELTON. So what are you short in, the jamming capability?

General YATES. We're short in jamming capability and in being able to identify and avoid the threats--those two areas.

Mr. SKELTON. Now, back when we initiated this program, were those two problems included in the initial specs and proposed costs?

General YATES. Yes, sir, they were.

Mr. SKELTON. But you're coming out now some $1.4 billion short; is that correct?

General YATES. Yes, sir, that's right.

Mr. SKELTON. So you misjudged somewhere along the line?

General YATES. We didn't misjudge as much—misjudge sounds like we failed to estimate correctly.

Mr. SKELTON. That's right.

General YATES. What we did was we failed technically and the architecture of the ECM system did not do what we set out to do.

Mr. SKELTON. In other words, you had too much concurrency. You sold us on getting the B-1 that you'd be able to do it for that cost; is that not correct?

General YATES. Yes, sir, that's right.

Sir, I would add, we sold you B-1 based on the fact we'd do it for $20.5 billion. We're now saying it will take $330 million more than that. So we're now saying instead of $20.5 billion, which is what we sold you, we now say it will take $20.88 billion.

Mr. SKELTON. Now you're being a little inconsistent. A while ago you said it was $1.4 billion.

General YATES. What I'm saying, sir, is that of the $1.4 billion mentioned by Mr. Aspin to remedy the ECM problem, $725 million for the "core" is included within the $20.5 billion already. In other words, of the $20.5 billion, we're bearing the load of most of it.

Mr. SKELTON. General, we cut your water off. You got 97 airplanes. What do we have, to go back to my original question—what can you not do if push comes to shove with the airplane?

General YATES. Nothing. There's nothing we cannot do. The B-1 penetrating bomber and it can penetrate today.

Mr. SKELTON. Can you send it out on a mission of the most difficult sort today and have it succeed and return?

General YATES. Yes, sir.

Mr. SKELTON. Then what's the purpose in the $1.4 billion?

General YATES. What we say is, is we look ahead at the threats that we know are coming in the next couple of years, then we need to be able to counter those threats, so we will need additional ECM capability.

The CHAIRMAN. Will the gentleman yield?

Mr. SKELTON. Yes.

The CHAIRMAN. Why don't we just do that with the B-2, which is coming along?

General YATES. Sir, we need them both. We need both penetrating bombers.

The CHAIRMAN. Why?

General YATES. As I mentioned earlier, they bring things to the equation that nothing else does.

The CHAIRMAN. I understand penetrating bombers; but why two penetrating bombers?

General YATES. We do not have enough—with just the B-1—there are more targets which we would hit with a penetrating bomber than we can hit with just the B-1s.

The CHAIRMAN. I wasn't suggesting that. I was suggesting not fixing the B-1 and buying the B-2. Flying the B-1 is a penetrating bomber as long as it can and then buying the B-2 to be the penetrating bomber.

General YATES. Mr. Chairman, our view is that in order to get the job done we need both, and we need to fix the B-1.

The CHAIRMAN. Why?

General YATES. Because the targets that we have to attack with bombers are going up, not down.

The CHAIRMAN. Buy more B-2s. What targets can the B-1 hit that the B-2 can't?

General YATES. There aren't any targets that the B-1 can hit that the B-2 can't.

The CHAIRMAN. Then why are we putting $1.4 billion into the B-1? Why aren't we just buying B-2s in your program?

General YATES. More than the planned number of B-2s, more than 132?

The CHAIRMAN. Whatever it is.

General YATES. Mr. Chairman, I guess our view is——

The CHAIRMAN. I know the B-2 is an expensive plane with a fly away cost is $250 million. You could buy a lot of B-2s with $1.4 billion, $1.5 billion.

General YATES. Our view is that there's more contribution to the whole force by bringing up the 97 B-1Bs to a fully combat-effective capability for the mid-1990s and beyond——

The **Chairman**. We all know that we're dealing at the margin here, General. Putting the $1.4 billion in here increases the survivability of the B-1 on its mission.

General **Yates**. Downstream.

The **Chairman**. Downstream.

I do not think this is a classified number—we'd improve it by about 25 percent with the core program and another 5 percent with the—you're improving it by 30 percent.

The question is, is it worth spending that kind of money on the B-1s? Indeed in a constrained world, I do not understand why the Air Force wants to spend all this money on bombers. I mean, one bomber, sure. Why two bombers? Why fix this bomber? Why are we spending 1.4? I do not hear reasons that say that the B-1 is somehow unique to a bombing mission that can only be done by the B-1, therefore, we need to preserve it as a penetrating bomber into the future—even though it is a penetrating bomber.

It is a penetrating bomber now until the foreseeable schedule on which the B-2 comes into it.

General **Yates**. What I'm saying is, I'm not saying that there is something unique that the B-1B can do that the B-2 cannot do.

What I am saying is that for the number of B-2s that you could buy for $1.4 billion, that does not offset bringing the full 97 airplanes up to a full combat capability—1.4——

The **Chairman**. But you know, even with the 97 combat B-1s, even with the 1.4, are not as good at penetrating as the B-2.

General **Yates**. That's true.

The **Chairman**. All right.

So the question I'm still asking is, I do not see where the case is, and have not heard the case, of what the marginal additional penetrating capability—in a time of constrained budgets, the fact that the B-1 is a penetrator now and, indeed, will be even in 1996 on a somewhat constrained circumstances—you're spending $1.4 billion to upgrade that capability at a time when the B-2 will be coming in.

If you're sitting there, and the B-1 was our only bomber, and you're telling us, as you are now, that it can penetrate now but it won't in the future, and you needed $1.4 billion, $1.5 billion, that's one thing.

But you've got a case for 1.4, 1.5, but you've also got the B-2 coming along. I do not see anywhere in any of the presentations that the Air Force is making, is why in a time of constrained budgets we should spend 1.4, 1.5 on improving the penetrating bomber of the B-1 by 25-30 percent at a time when you've also got the B-2 coming on.

General **Yates**. Mr. Chairman, I don't believe that I can provide that answer here in this setting. But I'll be happy to provide that later to you to try to explain why a 30 percent increase in penetration capability for the entire B-1 force offsets in combat capability the additional 3, 4 B-2s that we could buy, I think we can explain that to you.

Mr. **Skelton**. May I reclaim my time?

The **Chairman**. Go ahead.

Mr. **Skelton**. I'm not sure I follow you on that last statement because if we believe what has been in the press and evidently came from the Air Force, the entire Libyan raid, which occupied some 100 airplanes, could have been done by three or four B-2s. So you don't need that many, to begin with.

Now let me go back. We have the B-2 coming on—and I know this is not a closed session, but you're talking about really advanced technology. I have compared the B-2 to the airplane as the submarine is to surface ships. It's an entirely new type of technology which I understand would cause the Soviets to have to redo their entire radar systems.

Is that not basically true?

General YATES. Yes, sir.

Mr. SKELTON. So why are we not putting more emphasis on that—and I've heard you testify and you make a good case for the B-2—why are you not putting your money in that?—money is limited—than trying to upgrade something that is really betting against the future, when you really have the technology in the B-2 coming along, which is matchless in this world.

Is that not correct?

General YATES. Yes, sir.

Mr. SKELTON. Thank you.

The CHAIRMAN. Let me make a little prediction. I don't know how this is going to come out. I would guess on the question of whether we fund the extra money for the B-1 or not will depend a lot on how the B-2 looks. I think you've got programs that are in competition here.

If we fully fund the 1.4 for the B-1, it's going to come back to haunt the B-2 program at some point, and vice versa.

Norm Sisisky?

Mr. SISISKY. I agree with you 100 percent, Mr. Chairman.

The 1.4, are we talking about then year dollars?

General YATES. Yes, sir. The $725 million for the "core" comes from active/lapsed accounts while the $489 million for RWR and $250 million for deferred depots support equipment requires TRW Budget Authority.

Mr. SISISKY. What are we really talking about as you make the picks?

General YATES. That's then year dollars, that's what you would appropriate—$489 million over 6 years for the RWR and $250 million over 4 years for deferred support equipment.

Mr. SISISKY. So we could be talking about 4 or $5 billion?

General YATES. No. You appropriate then year dollars, that's what we're talking about—1.4.

Mr. SISISKY. But 1.5 is then year dollars?

General YATES. I'm sorry?

Mr. SISISKY. The 20.5 billion——

General YATES. The $20.5 billion is in base year 1981 dollars.

Mr. SISISKY. Base year dollars. The 1.4 is then year dollars?

General YATES. Yes, sir.

Mr. SISISKY. All right, since they talked about everything I want to talk about, I'll just ask one other thing. What's the Air Force plans about the RWR contract?

As you know, the GAO recommended that this contract be terminated?

General YATES. Yes, sir, I know.

Mr. Sisisky, I'll have to tell you, that's obviously a very sensitive legal issue. We are weighing the GAO's recommendation. We're getting advice from a number of other legal directions, too, and we've not yet decided what we're going to do.

Mr. SISISKY. What are we supposed to do?

Do you know, Mr. Chairman?

The CHAIRMAN. This is the place where Loral has won the contract but then protested by Litton, and the question is whether—it's tied up in the Ill Wind investigation, and the question is whether you're going to go ahead and give the contract to Loral or abide by the GAO recommendations. I guess it's the Air Force call at this point.

General YATES. Yes, sir.

Mr. SISISKY. Thank you.

The CHAIRMAN. Any other questions on the subject here?

Mr. Rowland? Anything, not necessarily on bombers.

Mr. ROWLAND. Thank you, Mr. Chairman.

I want to follow up on a few questions.

General, a few moments ago there was a press conference held by a bipartisan coalition of members talking about the Midgetman. Last year, the Congress appropriated money for the Midgetman and the MX, if memory serves me correctly I think it was $250 million each to allow an alternative for the next administration.

I think many people in the Congress last year anticipated that the next administration—whomever it was going to be—would make a decision, a choice, as to whether they wanted to proceed with the MX or the Midgetman. We are all well aware of the decision that did take place so far and the process that took place.

Now, is it correct to say that the Midgetman so far has expended about $3.35 billion?

General YATES. Yes, sir, over $3 billion.

Mr. ROWLAND. What would be the life cycle cost of the Midgetman at this point?

General YATES. Life cycle costs?

Mr. ROWLAND. To develop and procure the entire program?

General YATES. It's to buy 500 missiles is about $24 billion.

Mr. ROWLAND. 24 billion?

General YATES. Yes, sir.

Mr. ROWLAND. Is that in addition to all the research and development?

General YATES. Yes, sir.

Mr. ROWLAND. We've heard proposals, we've heard numbers during last year's hearings, at the $35 billion level.

General YATES. That depended on basing modes. In addition, there have been some better estimates over the past year and the cost of the program have come down.

Mr. ROWLAND. Does that include maintenance costs? Did you say that included the basing cost also?

General YATES. What I gave you was the acquisition and the basing costs, not the O&M.

Mr. ROWLAND. OK, let me take everything in.

O&M—every type of cost that we can incur in development and procurement and operation of the Midgetman over the next—well, I'm assuming the next 10 years; maybe I should go more to 15 years.

General **Yates**. I'd have to get you that number. I don't know what it is.

Mr. **Rowland**. So you're saying 24 billion would be the minimum at this point?

General **Yates**. Yes, sir.

Mr. **Rowland**. Could it be as high as $35 billion when you're including the basing operations and the maintenance in O&M?

General **Yates**. Sir, I'd have to get that for you.

[The following information was received for the record:]

ESTIMATES

The 15 year Operations and Support (O&S) cost is $3.9 billion (FY 88$) for Midgetman at 3 Minuteman bases or $3.3 billion (FY 88$) for Midgetman at 2 Minuteman bases. The OSD Cost Analysis Improvement Group (CAIG) approved O&S cost elements that comprise these total costs are personnel and training, O&S consumables, other direct costs, depot maintenance, sustaining investments, and indirect O&S.

Mr. **Rowland**. Not to put you on the spot, but do you think we should go with one missile system—one land-based missile system—in light of the tremendous costs that we're facing and the fact that we've cut $10 billion out of the defense budget already?

General **Yates**. Sir, I think the SECDEF has already testified that what we intend to do is what the President's budget supports at this point, is continuing to fund the small ICBM, leading toward a certification of the missile, and the dollars which are included in President Bush's budget does that.

There would be additional dollars which would have to be added in order to accomplish the basing development which would have to be done.

Mr. **Rowland**. Do you think we could afford two land-based missile systems?

General **Yates**. Sir, we have afforded them in the budget, and Secretary Cheney and the President think they are affordable; obviously, I do.

Mr. **Rowland**. I didn't think you'd have a different answer—maybe privately.

On the B-2, I noted Robert Costello's recent comments about the program and he is coming out with a full recommendation at this point, in private life, that it be canceled outright.

Would you make a comment on that?

General **Yates**. I'm surprised at Dr. Costello's comments. The B-2 program does not have technology problems. The manufacturing capabilities that are being used with the B-2 are the most sophisticated in this country. Thus far, we are not displeased with what we have seen come off the production line. So I'd have to say that the Air Force is still excited about the prospects for the B-2 and we're anxious to go fly it.

Mr. **Rowland**. I think you may have noted some of the anxiety or perhaps the fact that many member of the committee and the full committee are getting somewhat antsy about the B-2 program and some of the costs.

What would be the problem if there were a slowdown in the procurement of the B-2?

General YATES. First, I would add that the President's budget, as submitted, substantially slows the program down, very significantly. We think that where we are is about the minimum that you would want to be for any program and still be able to realize any production efficiencies.

So the impact of further slowdown, sir, would simply be that you would have a disproportionate increase in the total program costs.

Mr. ROWLAND. You may want to provide some of those costs to the committee. There may be some interest in that.

One final question with regard to the F-15. In the past it's been stated that the requirement for the F-15E was about 392 aircraft. I understand the revised 1990 budget would terminate the program after 1991 at a total of 200 aircraft.

Has the threat changed enough to warrant this reduction or is this reduction simply driven by the financial constraints? If the decision stands, won't we be in a position of shutting down the only dual role fighter in production?

General YATES. The decision is strictly fiscal constraints. As the chairman said earlier, this is a time of tough choices; the threat has not changed. We needed the full number of F-15s and we had to make those tough choices. So we have terminated the program after 200 airplanes.

So it is not the only dual role fighter in that the F-16 is a multimission airplane, but it is the only deep strike, deep interdiction, dual role fighter that we have.

Mr. ROWLAND. More important than perhaps two land-based missile systems?

General YATES. No comment.

Mr. ROWLAND. Thank you, Mr. Chairman.

The CHAIRMAN. Other questions?

Ike?

Mr. SKELTON. I'm intrigued by your comments, Mr. Rowland, on the F-15. You make a pretty good case for it. That doesn't quite fit with what you're proposing on the B-1. It seems to me that you have a proven technology, dual role fighter, that reading between the lines you'd give your eye teeth to keep, and betting against unknown threats for $1.4 billion on the B-1; and your comments earlier on the B-2, which I happen to agree with, is such an advanced and important piece of technology.

All of these aren't jiving in my mind in coming from your testimony, General.

It seems like you want your cake and you want to eat it, too. You can't have it all.

General YATES. Right, and that's exactly the way I would ask you to read my comments. We think the F-15E is an excellent airplane. We hate to give it up along with a lot of other things we're giving up. But we think, for one thing, the B-1B ECM enhancements are so important and so high in our priorities——

Mr. SKELTON. That's more important than the proven technology of the dual role F-15E?

General YATES. Yes, sir.

Mr. SKELTON. It is, that's your testimony?

General YATES. Yes, sir.

The CHAIRMAN. Pete?

Mr. SCRIVNER. General, since we've been talking about concurrency this afternoon, let me just run through a couple of programs quickly with you, and kind of tell us where you see things and where you expect them to be.

First of all, on AMRAAM, you want to make a full rate production decision in September. Where are we, precisely, with the test program?

Do we now consider the missile to have a stable design? Are we confident that what we are buying is really the missile we want?

As I understand it, the test program has been with a different software. What impact on performance will the new software have? If it's not being tested before that full rate production decision is made, how do we know we're really going to get what we pay for?

General YATES. Let me square you away on that.

We're real happy with the way the AMRAAM test program is going. Clearly, there's a germ of truth in what you say about the software because as in any test program, as you go through the test program, you have software releases and software changes. I mean, you're authorized to get smarter as you go through the test program.

But for the last year or so the software in the AMRAAM has been extremely stable. We uncovered some faults in the test program. We're now on the second, or what I call a loop; in other words, we instituted changes, run them through all the testing, now we're going back again and shooting missiles with the final full up software. So we're not going to be making any full rate production before all of that has been tested.

We've shot 95 missiles; 76 of the 95 have been successful for 78 percent. We will shoot 11 production missiles in IOT&E; in other words, under realistic operational conditions. So the performance of the missile and the test program, I think, it is extremely solid.

The missile has been shot and hit targets from 50 feet to 55,000 feet; from slow speed to supersonic; up to 9 G targets, multiple targets; extensive ECM; it's been fired from F-14s, F-15s, F-16s, F-18s. There are a few things that we found as the first run through the DT&E program that we are now fixing and testing in the IOT&E program. That should be done by September. I'm very comfortable where that stands.

The only problem we have right now of significance in the AMRAAM program is the captive carry reliability program. The missile did very well in captive carry testing. On the F-16 it has not done well—on the fuselage stations. On the F-15, the vibration spectrum is exceptionally high under certain conditions.

Now, a condition is transonic, powered idle, deceleration, high G; there's a lot of spill out of the intake. It is a very rugged environment across the bottom of the airplane. That is not meant to be a three sigma point. That's something that guys do in combat and the missile's got to hold up under those conditions.

So as far as I'm concerned, that's the lone remaining area that right now that we should be concerned about in the AMRAAM program.

Mr. SCRIVNER. Is that why the independent test group has reclassified this part of the program as a demonstration program?

General YATES. Yes, correct. On the captive carry reliability program, it's clear that we needed to make some fixes. We have made some fixes. Right now the initial testing of those fixes on the ground look good. We've got missiles with the fixes on them flying at Eglin now; but not willing to pass judgment on them until they fly some more, but we think they're looking pretty good.

Mr. SCRIVNER. You think that everything will be in place and all the data analyzed to support the September 1989 decision?

General YATES. Yes.

Mr. SCRIVNER. All right.

On the C-17, there's been some problems with the mission computer, electronic flight control system—avionics generally. There's also some indication that the first flight might slip from August to December 1990.

So that we don't repeat the past experience we've had we've discussed here today, what assurances do we have that we're not getting ourselves into another highly concurrent program that I guess today is going to cost around $37 billion?

General YATES. On the C-17, to begin with, in the first place, the slip of the first flight is not a fait accompli. But if asked and had to bet money on it, I'd say that there's some high probability that it might slip to December.

A 4-month slip on first flight ought not in your mind to reflect any sort of fundamental difficulty with the program. I think the reasons for that are two. Number one, are the ones that you mentioned, which were basically a software problem which we recognized late because of wind tunnel testing and went to digital flight control system—and you mentioned that.

But the second problem has been the assembly on the first airplane. While started on time, it has taken longer. The reason for that has been a capacity problem at Douglas. They have taken action to square that away by buying the Rockwell facilities at Columbus, so they have alleviated the capacity problem. So that while there may possibly be a 4-month slip in that first flight, we don't see any slip on delivery of the first airplane to MAC nor in the operational capability.

The CHAIRMAN. Let me just interrupt. Pete can speak for himself, but a slip in the program in the first flight is not my concern nor I think any kind of test failures and other things.

What does bother me about this is that it seems to be the inability of the Air Force to learn from experience in terms of this concurrency. What bothers me about the C-17 program is, again, its concurrency.

How many planes will we have bought under the C-17 before we finish the test program?

General YATES. Sir, we'll have bought, by fiscal year 1992, 42 airplanes.

The CHAIRMAN. Forty-two airplanes, and that's when the test program is completed?

General YATES. Yes, sir.

The CHAIRMAN. That's crazy. You bought 42 planes before you finished the test program.

General YATES. I'd like to remind you, Mr. Chairman, that on a C-17 program, we do have contractual event-based milestones for each go-ahead for the next production lot. So that unlike the B-1B program, as we are going through the test program, if you haven't achieved the significant event at that point in the test program, you cannot take the next production option; and the contractor has to keep that production option open at his expense.

The CHAIRMAN. I understand, but that still means that we're doing the test in phases at the same time that we're producing in phases. So that if you get to the point where you say, yes, we can't go on to the next lot unless we're satisfied on this test, but you ought not be able to go on to that next lot unless you've done more than one test.

The basic problem is that you ought to have completed all of the tests until you've bought, paid for, and put in the bank, even if you make the milestones, you still——

General YATES. Mr. Chairman, what we're having here is a discussion on concurrency. Obviously, one can do away with all concurrency in any program——

The CHAIRMAN. That is not the problem. General, that's not what anybody here is suggesting. But the Air Force keeps doing this over and over again. We can't say about the B-2, but that was a concurrent program—C-17. You just yourself said that the problem with the Eaton contract was that they up and signed not only the R&D contract but the production contract on the same day the two contracts were signed. The company itself knew it couldn't do that it was such a high risk, that they wouldn't accept any risk.

So the Air Force accepted all the risk with the taxpayers' dollars. The taxpayer ended up paying twice for the ECM and we still haven't got an ECM that we thought we were buying in 1981. Why? Because of concurrency and because the company, working with its dollars, is smarter than the Air Force working with the taxpayers' dollars.

General YATES. We don't think that's the case in the C-17, Mr. Chairman.

The CHAIRMAN. It's got the same problems. It's clearly not as concurrent as the Eaton contract. What guarantees have we that we won't do a contract like the Eaton contract again in the future? What Air Force regulations have come out?

You said you're very unhappy with what happened there. As I said, I don't think you can be as unhappy as I am. But I want to know, what changes in Air Force regulations, what changes were promulgated throughout the system to make sure that that doesn't happen again?

General YATES. I think the B-1 was one of the motive reasons that the Congress and the administration all became interested in reforming the entire acquisition system.

The CHAIRMAN. Good.

The question is still, if the Air Force is so unhappy with this contract that was signed 9 years ago, and we've gone through several iterations trying to build this back and the core program which you presented to us is only the final version of three or four attempts to make it work with milestone zero, milestone ones—that didn't work—we're back to the drawing board.

If they are all so unhappy about that, tell me what regulations are different in the Air Force. Point to a number. Give me a page and a number of something that's different to make sure that that Eaton contract cannot happen again.

General YATES. Mr. Chairman, I got your point, but I know you don't want us——

The CHAIRMAN. The answer is there isn't any.

General YATES. My answer would be that you don't want us writing regulations about how to acquire complex systems that——

The CHAIRMAN. I want regulations to make sure there isn't a contract—that you signed the production contract and the R&D contract on the same day.

It's not an either/or. I'm not saying you want to write complex or any other. I'm just talking about this problem of concurrency.

What has changed? If it isn't a contract regulation, what has changed? What is to prevent the Air Force from making the same mistake twice, especially seeing as how in 5, 6, 8, 10 years all the people that were involved in it will be on doing other things and you've got a whole new bunch of people doing the next procurement program, whatever it happens to be.

Tell me what guarantee we have that we won't again face the problem of spending another $1.4 billion to fix something that we thought we were buying in the first place, and then only get 90 percent of the capability.

What's to prevent this from happening again when all of you go on to your next command?

General YATES. If you will accept as a guarantee the fact that we have revised the entire acquisition system——

The CHAIRMAN. Partially.

General YATES. Partially.

The CHAIRMAN. Partially.

General YATES. We have more visibility into what's going on in the programs; more control at a higher level; and more direct communication between program directors and the Air Force acquisition executive, then I'll tell you that such a thing won't happen again in the future.

If you're asking me if we have written a regulation which precludes signing the development and the procurement contract on the same day, the answer is, no, we haven't.

The CHAIRMAN. I think "no" is the right answer for the whole question.

Thank you.

Mr. SCRIVNER. General, to continue this theme for just a minute here.

You've got another program—the AC-130U gunship program. As I understand it, you're looking to sign the first procurement contract in June of this year. Yet, we don't start the test program until April of 1990 and the test program isn't completed until 1992. Why?

General YATES. Again, this is a very, very concurrent program. Here's why it's necessary to sign the procurement contract. First, Rockwell will exceed the ceiling on this contract, and by our estimates it will cost Rockwell about $65 million. The contractor is responsible in this case for that overrun.

Further, the contract specifies that he has total system performance responsibility. He is under contract to fix all deficiencies discovered in the test program and during the warranted period, which is from 1 year after we accept airplane, or 2 years after the end of interim contractor support, whichever is later.

Now, we have got, in this case, the Government covered. If we fail to execute the contract this summer, then we let the contractor off the hook. Then we have to go back and renegotiate the contract sole source to Rockwell and we'll pick up all of that. So, basically, given that he's overrun on an FPI contract, at this point he is firm fixed price to the Government, he is performing to the contract, and he's having to pay for the overrun.

He is obligated to fix any of the discrepancies which come up during the test program.

Mr. SCRIVNER. You are assuring the committee, then, that there will be no waiver of any of the contract stipulations with regard to performance, that the contractor will be held liable for any and all cost associated with any retrofits or fixes; and that same standard applies to the C-17; is that correct, under the contract that you just discussed?

General YATES. I would have to look at the C-17 contract before I testify to that extent. I can testify to that extent on the AC-130U. I can tell you that on the C-17 we have got extensive warranties. I can tell you that the contract is event-based.

I'm not able to tell you with certainty that all of the same stipulations apply to the C-17 contract. I'd have to answer that for the record.

Mr. SCRIVNER. All right.

[The following information was received for the record:]

CONTRACT DISCREPANCIES

The C-17 procurement contract contains an extremely strong and unique warranty program that holds the contractor liable for costs associated with retrofits or fixes. The warranty program includes 45,000 hours on the structure, 5 years on electrical subsystems, 10 years (or 20,000 landings) on the landing gear, and 5 years maintenance service on the engines. Additionally, all essential performance parameters are covered; e.g., range, speed, payload, takeoff and landing distances.

Mr. SCRIVNER. One final question on the B-1. We're told that the RWR costs for the B-1 is about $624,000 a unit. This same system, as we understand it, is the one that they want to put on the F-16, and yet, that unit cost is about $271,000.

Could you explain to us why there is——

General YATES. I don't know the source of those numbers. I would have to explain that. The RWRs will be bought on the same contract. I mean, we'll combine all those buys in the Air Force for whatever we're buying.

I don't know, Pete, if the number you have is installed, and R&D, and all; I can't reconcile those. I'll have to answer that for you. There shouldn't be a difference in the purchase of the unit.

Mr. SCRIVNER. There should or should not be?

General YATES. Should not.

Mr. SCRIVNER. This would be for the RWR unit and the antenna.

General YATES. Now, wait a minute. Antenna would be different.

Mr. SCRIVNER. We're told that the F-16 Program Office negotiated for the unit at a cost of $271,000. So are you saying that the difference is——

General Yates. What I'm telling you is that for the same units, you should have the same cost.

Now, the antennas are going to be quite a bit different, and the installation, obviously, will be quite a bit different, as will the integration into the airplanes.

So I just don't know the makeup of the cost number you read off.

Mr. Scrivner. We have some questions for the record, including some classified questions on space programs that we'd like to have you address.

Thank you, Mr. Chairman.

The Chairman. Norm.

Mr. Sisisky. How is the testing of the close in air support plane doing? Are you testing different aircraft.

General Yates. We haven't started that yet, sir. I know Mr. Krings has forwarded to the congress a test plan for close air support airplanes. What the Air Force intends to do and what the President's budget contains are modifications to 146 F-16s to use; those are block 30 airplanes; modifications to 225 A10s.

The Department of Defense has really not done the close air support tests nor have they decided what the next close air support airplane will be.

Mr. Sisisky. Wasn't there language in the Senate bill—I think in the final bill—that called for the AV8 Harrier to be tested?

General Yates. Senator Dixon's amendment to the base closure bill asked for a test plan. That test plan has been provided. That test plan included a plan to look at A10s, F-16s, AV8Bs, and A7s, and decide if it was worth proceeding on with the more expensive and complex tests.

In other words, it was an opportunity for those airplanes to disqualify themselves for further testing.

Mr. Sisisky. Thank you.

The Chairman. Russ.

Mr. Murray. General, if I understand you correctly, the Government is protected on the AC-130. In the event that the testing shows that there have been some failures in the contractual specification, the contractor has to make that good at no cost to the Government; is that right?

General Yates. If there are failures to the contractual specification, you are right. Is that what you said?

Mr. Murray. Yes.

General Yates. Yes, the answer is yes.

Mr. Murray. Now, what happens if during operational test there is a deficiency found that is not a matter of contractual problems? It's simply something that indicates that the aircraft's performance is unsatisfactory but was not covered in the contract.

How is the Government protected under those circumstances.

General Yates. If in fact, and this is hypothetical, of course—if in fact something came up that we have not put in the specification and it was unsatisfactory to us, we have two choices: We either live with it or we would have to amend the contract with an ECP and get it fixed.

Mr. Murray. So the Government then is not protected against failures and operational testing, which might be an argument for waiting until the operational tests are completed before the aircraft is bought.

General YATES. I would correct you in one thing. The Government is protected against all failures, development testing, and/or operational testing, which are failures to meet the specification.

If the Government adds additional requirements to the contract, which are not now known nor written into the contract, then we are not protected against those. But we are protected against any failure which might occur in operational testing.

Mr. MURRAY. Of course one of the things that is important about operational testing is it covers the question of whether the weapon is worth buying, whether or not it meets its operational requirement which is why we do operational testing.

The question is, should you not wait until you had an operational test before you invest a great deal in the aircraft?

General YATES. In this case, again, I feel that we are protected, although I accept your point. If we find something in any case, either development testing or operational testing, which is outside the specification that we have with the contractor, then we will make that change.

Mr. MURRAY. Thank you.

The CHAIRMAN. Doug.

Mr. NECESSARY. General Yates, I have one question concerning the multiyear proposal that you identified earlier.

As I understood it, there were 6 multiyears requested in the 1990–1991 timeframe. Further, it's my understanding that all those programs are either now and/or have been in production in recent years. In fact, three of them, I think, represent a follow-on multiyear.

The question is, are the savings identified based on negotiated options to perhaps existing contracts or not to exceed negotiated between the Air Force and industry, or are these just unilateral Government estimates of savings?

General YATES. The ones that I have identified in the briefing?

Mr. NECESSARY. Yes.

General YATES. What those are are savings as opposed to a yearly buy.

Mr. NECESSARY. No, I understand, but are they based on negotiated, not to exceed prices with industry; given that these are ongoing programs. In other words, are they based on something that's an actual in the contractual sense, or are they just parametric Government estimates?

General YATES. They are in general not negotiated. As a matter of fact, remember, two of those are multiyear buyouts. So what will happen is we'll go through a competition for those. That's just an estimation of what we expect to get out of that competition. So, generally, they are parametric.

Mr. NECESSARY. The ones that are not buyouts, then, they're also parametric?

General YATES. Yes, I believe that to be right. I'll have to provide you, for the record, an accurate answer to that. I believe they are based on parametrics. There may be one in there that's got something firm, but I'm not aware of it.

[The following information was received for the record:]

MULTIYEAR PROPOSALS

Of the Air Force's 6 multiyear procurement candidates in fiscal year 1990/fiscal year 1991, three (Combined Effects Munition, Imaging Infrared Maverick and AN/TRC-170 Troposcatter Radios) are proposed program buy-outs. The estimated savings for the remaining three programs, the KC-135R in fiscal year 1990 and fiscal year 1991's Defense Support Program's Satellites and the Global Positioning System's Satellites were determined using a variety of estimating techniques, including the use of contractor inputs (not contractually binding), historical costs, independent cost estimates, and additional Government analysis.

Mr. NECESSARY. Thank you.

The CHAIRMAN. Mr. Rowland.

Mr. ROWLAND. Thank you, Mr. Chairman.

I wanted to follow, maybe just to clarify in my own mind, a concern you brought up on the C-17 in relation to—I think you related to the B-1. General, is it true that the B-1 and the testing and procurement process has a much more complex mission—high risk, higher capability? That may be significantly different than the C-17, which has a simpler task, for lack of a better term.

Is that a fair comment in the sense that you've got engines that have millions of dollars of commercial time, for example; not as complex a mission as the B-1? Therefore, would the testing in the process you're using now, does that work better than the B-1 process works?

General YATES. I think that the point you raise is excellent. The C-17 program is viewed as a low-risk program by the Air Force. Clearly, your assessment of risk mitigates the concurrency that you put into the program.

So I think it's, in my view, as I've mentioned to the chairman, I don't think that's a good comparison.

Mr. ROWLAND. Is it still on time? Are there any major problems? is it still a top priority of the Air Force?

General YATES. It's still a top priority. There are no major problems. As I mentioned earlier, I do think there is a possibility of a slip in the first flight of up to 4 months, but that remains to be seen.

Mr. ROWLAND. Thank you.

The CHAIRMAN. I thought the B-1 was considered a low-risk plane, General Yates?

General YATES. Not by me.

The CHAIRMAN. What? Come on, I was certainly sold by your predecessors—we've always got the problem of predecessors—but everybody argued that the B-1, because of all the money and time invested in the B-1A, the B-1B was a low-risk operation, therefore, we could do concurrency.

What do I hear? What do I hear?

Eighty percent was the testimony. Eighty percent of this, we've already done in the B-1A. That was the argument. You make that argument for the C-17. That's exactly the argument that your predecessor made about the B-1B. It's a very good analogy.

Thank you, Mr. Rowland, for bringing it up.

[Laughter.]

The CHAIRMAN. Any other questions?

If not, General Yates, thank you for being so entertaining. This was very helpful today, and thank you for your testimony, sir.

General **Yates**. Thank you very much.

The **Chairman**. The hearing is adjourned.

[Whereupon, at 3:55 p.m., the subcommittee was adjourned.]

[The following questions were submitted to be answered for the record:]

MULTIYEAR PROCUREMENT PROGRAMS

Question. What percent of the funds allocated for respective Air Force accounts (aircraft, missiles and other procurement) over the FYDP would be locked in through multiyear procurements?

Answer. For aircraft, missile and other procurement accounts it amounts to 22.4 percent over the FYDP. For each year it is: fiscal year 1990 11.4 percent; fiscal year 1991 11.2 percent; fiscal year 1992 18.4 percent; fiscal year 1993 35 percent; and fiscal year 1994 30.2 percent.

Question. How do these percentages compare to previous experience?

Answer. Previous experience shows multiyear procurement as a percentage of the total procurement accounts to be: fiscal year 1984 27.6 percent; fiscal year 1985 33.6 percent; fiscal year 1986 24.2 percent; and fiscal year 1987 11.3 percent. One or several very large MYP programs can significantly affect the percentages.

Question. Which of the proposed multiyears over the FYDP meet existing multiyear criteria (fully funded in the FYDP; minimum economic production rates; 12 percent savings as compared to annual contracts; and 10 percent savings as compared to existing multiyear contracts).

Answer. Each of the candidates meet the multiyear criteria of 10 U.S.C. 2306(h). Additionally, these candidates also meet most of the conditions of the fiscal year 1989 Authorization Act. The estimated savings percentages for the AN-TRC-170, DSP, C-17, and AMRAAM do not meet or exceed the 10 percent savings requirement.

MAVERICK

The Air Force has nominated IR Maverick as a multiyear procurement (MYP) program in fiscal year 1990 and plans to downselect to a single producer. Candidate multiyear programs are predicted to achieve 12 percent or more in savings over annual procurement practices.

Question: Please explain how the Air Force expects to achieve this savings.
Answer: By using a MYP contract, Maverick is expected to achieve at least 12 percent savings over annual procurement practices. These savings accrue from several sources: 7 percent from economic order quantity purchases, 2 percent from manufacturing efficiency increases, and 3 percent from inflation savings.

Question: What assumptions were used to compute the savings?
Answer: These estimates are based on contractor submittals of potential savings through multiyear contracting which ranged from 10.0 percent to 15.3 percent. Our Air Force estimate has been validated by an independent contractor study and by an independent cost analysis performed by the Air Force Comptroller. Savings are calculated by comparing the MYP program with a baseline program consisting of an annual contract with two one-year production options.

Question: What kind of baseline "annual" procurement strategy is used for comparison?
Answer: For comparison purposes, the MYP and annual contract with options both buy the same quantity of missiles as depicted in our MYP justification documents submitted to Congress with the fiscal year 1990/91 Budget. Our savings would be greatest if we could permit the contractors to compete without restriction to annual or total production quantities. MYP savings are maximized if the contractors have the flexibility to price to the production strategy which provides the largest quantity of missiles for a fixed dollar limit.

Question: How did the Air Force's requirement for IR Maverick drop more than 60,000 required last year to less than half that requirement in just one year?

Answer: The total Air Force procurement objective for the Maverick missile has declined from 60,664 to 23,496. Under the present budget plan, the program will terminate in fiscal year 1992.

The reduction in the Maverick missile procurement objective in fiscal year 1990 results from budgetary constraints. The wartime requirement for air delivered antiarmor weapons remains high; however, we are developing the Sensor Fuzed Weapon (SFW) to enter production in fiscal year 1991, and fiscal constraints dictate that we terminate Maverick production as SFW enters the inventory. The Air Force is committed to full support of our ground forces by providing antiarmor as well as other air-to-ground weapons delivery capabilities. We are procuring the mix of antiarmor weapons, air superiority and ground attack aircraft, air-to-air weapons, and air interdiction weapons that is appropriate under the constraints of a limited budget.

Question: The Navy is also a key player in this program, with plans to procure a significant quantity of the AGM-65F Maverick. In addition, the Navy is studying a requirement for an extended range Maverick which would also have to be procured in a sole-source environment. Does the Navy fully concur with the Air Force's plan to down select to a single production source in fiscal year 1990?

Answer: The Navy participated fully in our programmatic decision process which led to our strategy to downselect to a single source. They agree that downselection is the most cost effective course at this time. If an extended range Maverick is developed, our current plan is to compete the design and qualify only one source for production. We do not expect the production quantity would support dual sourcing.

Question: Is the Air Force planning on retaining some degree of procurement flexibility should the circumstances and assumptions change after the single source decision is made?

Answer: Yes, we will retain priced options to the multiyear contract for additional missile production in fiscal year 1991 and fiscal year 1992. Also, the multiyear program losing contractor can still compete for possible option quantities. Their production line would be operating since they would still be producing missiles under the fiscal year 1989 Maverick contract.

Question: With reported technological advances in reactive armor, what has been done to test new systems, such as Sensor Fuzed Weapon (SFW), IR Maverick, and other antiarmor weapons, in some kind of "side-by-side" comparison tests?

Answer: We do not routinely conduct "side-by-side" comparison tests of antiarmor weapons. We conduct several series of tests, from Development Test and Evaluation through Follow-on Operational Test and Evaluation, for each weapon system we field. These tests are designed to match, as nearly as possible, the operational scenario for which the weapon will be employed. Each of our antiarmor weapons has been individually tested against the latest known armor configurations. Also, the Air Force Chicken Little program is specifically designed to assess antiarmor weapons for all services and is the Live Fire test agency for SFW.

B-1B #1

The Air Force is currently proposing a two part program to fix B-1B defensive avionics problems. The first effort known as the CORE program is currently estimated to cost $725 million. The program involves some changes to existing hardware to provide a common configuration, but is primarily focused on a series of three software upgrades to maximize the system performance within the current design. The program has a target date of August 1990 for completion of testing, with retrofit scheduled to be completed in October 1993.

The second effort involves procurement and installation of a Radar Warning Receiving (RWR) to cover those threats that cannot be covered due to the ALQ-161 design limitations. The current cost estimate for this effort is $489 million, with 6 months of testing projected to start in summer of 1991, and retrofit of all aircraft by the fall of 1995.

Question: What is the impact of the RWR program on B-1B Avionics compatibility testing?
Answer: The RWR will have a receive-only capability, and, as such, will not impact the other aircraft avionics systems. Our requirement to the integrating contractors will be to insure this compatibility.

Question: What additional Radio Frequency Signal Management System (RFSMS) requirements will result from the RWR effort?
Answer: A look-through/blanking software arrangement whereby the RWR and other avionics have interference-free operations.

Question: What is the schedule for completion of RFSMS testing?
Answer: The RFSMS testing for the ALQ-161A program is currently scheduled to be completed in September 1990. Further, as part of the RWR integration (FY 1992), RFSMS compatibility will be tested.

Question: Are funds currently available to complete RFSMS testing when current defensive avionics efforts are completed?
Answer: Currently that information is unknown. Assuming current defensive avionics testing continues on schedule funds will be available to cover RFSMS testing. If there are any major slips to the schedule funding shortfalls may develop; however, we don't anticipate that to be an issue.

B-1B #2

The current RWR cost estimate is based in a Rough Order of Magnitude (ROM) estimate by the program office.

Question: When will a more definitive estimate be available?
Answer: The B-1B program office will revise its original ROM estimate when the actual RWR system has been chosen for the B-1B aircraft. We have completed a revised estimate for the ALR-56M RWR integration, but are holding it in reserve pending the outcome of the Litton protest.

Question: Will the budget submission be adjusted to reflect more realistic numbers?
Answer: Yes. Once a specific RWR has been chosen, we will update our estimate to reflect the actual production portion of the RWR costs and report the revision in the next available budget update cycle. For now, we see the FSD portion of the program as correctly budgeted.

B-1B #3

B-1B program office information indicates that the current RWR cost estimate request is based on an estimated unit cost of $624,000 for the RWR unit and antenna. F-16 program office information shows that the current negotiated cost for the same RWR unit is about $271,000.

Question: Why is the B-1B estimate for this unit so much higher?
Answer: When the B-1B program office made its original ROM estimate (November 1988), the ALR-56M was in source selection, and its price was not available for source selection sensitivity reasons. We used the ALR-56C for estimating costs and program planning purposes. Once the Litton Protest issue is resolved, we intend to revise the B-1 RWR production costs downward. Meanwhile, the front-end FSD portion of the program is properly budgeted. Costs for acquisition and installation of the ALR-56M in the B-1 will not be identical to those for the F-16 since the antenna installations and other aspects differ between the two aircraft.

B-1B #4

Question: How many additional antennas will the RWR require on each aircraft?
Answer: The B-1B program office is currently conducting risk reduction studies on the RWR integration into the B-1B aircraft. This question is being addressed in these studies. Therefore, a specific answer will not be available until completion of the studies, and exact numbers will not be available until full scale development and flight testing have been completed. However, one of the risk reduction studies' tasks is to examine the possibility of using existing B-1 antennas for the RWR. While there is a possibility of using these antennas, we anticipate having to add additional antennas for the RWR. Existing RWR's have four high band and one low band antennas per shipset; therefore, the anticipated maximum additional antennas to be added to each B-1B aircraft will be five.

Question: What impact will this have on the aircraft radar cross section?
Answer: The B-1B program office is currently conducting risk reduction studies on the RWR integration into the B-1B aircraft. This question is being addressed in these studies. Therefore, a specific answer will not be available until completion of the studies, and exact numbers will not be available until full scale development and flight testing have been completed. However, plans are to skin mount the antennas on the aircraft. As a result, we anticipate radar cross section impacts to be very small.

Question: What impacts will this have on aircraft weight and range?

Answer: The B-1B program office is currently conducting risk reduction studies on the RWR integration into the B-1B aircraft. This question is being addressed in these studies. Therefore, a specific answer will not be available until completion of the studies, and exact numbers will not be available until full scale development and flight testing have been completed. However, the weight of the high band antennas is less than two pounds each and the low band, less than 20 pounds. Weight and range impacts of the antennas alone will be negligible. The weight of the entire RWR system is 130 pounds which would impact the aircraft range by only 2 NM.

B-1B #5

Question: In addition to the RWR unit itself, what other hardware is required to incorporate the RWR on the B-1B?

Answer: In addition to the RWR unit itself, Group A hardware (electrical wiring, amplifiers, shock mountings, clamps, fasteners, etc.) is required to integrate the RWR Group B unit (LRU's, antennas, displays) into the aircraft avionics and secure the RWR to the aircraft.

Question: To what extent will any such items require new development or modification to be used on the B-1B, and what will it cost.

Answer: The RWR Group A layout will be designed during full scale development, but hardware that exists today (wiring, amplifiers, etc.) will be used as is or modified to interface with the RWR and B-1B aircraft. The B-1B ROM estimate includes $7 million (BY 1988 $) to develop Group A.

B-1B #6

Question: Specifically, which threats will the ALQ-161A and RWR be programmed to detect?

Answer: Strategic Air Command (SAC) has a list of threats which the B-1B defensive avionics are to counter. The ALQ-161A will detect the top 11 of those threats, and the RWR will be programmed to detect as many of the remaining 39 threats as possible. The exact number will not be defined until after testing is completed and probability of detection trade-offs are made.

Question: Will the RWR be fully integrated into the ALQ-161A?

Answer: It will not be integrated into the ALQ-161A, and the two will not be dependent on each other for proper operation. We will explore the feasibility and benefits of integrating the RWR into the Defensive Systems Operator's (DSOs) controls and displays during risk reduction efforts.

Question: Will the RWR cue an automatic response from the ALQ-161A jammer and other defensive capabilities?

Answer: No. Since the two systems will not be integrated, no cued jamming or automatic response from the ALQ-161A will occur. The RWR will provide situational awareness only for the crew.

B-1B #7

Question: Will the ALQ-161A and the RWR use the same signal processor?

Answer: No. Each system has its own processing capability.

Question: If not, how will the two processors interface?

Answer: The two systems are planned to interface through the Controls and Display Avionics Control Unit; however, the two systems will not be dependent on each other for proper operation. We will explore the feasibility and benefits of integrating the RWR into the Defensive Systems Operator's controls and displays during risk reduction efforts.

Question: Will any degradation be experienced in the ALQ-161A receiver/processor when using the RWR?

Answer: No.

B-1B #8

Question: What action does the Air Force plan to take on the recent GAO finding sustaining the bid protest of Litton Systems against the award of the F-16 RWR contract to Loral?

Answer: On May 30, 1989, the Air Force formally requested that the GAO reconsider its recommendation. This action was taken on the basis that the GAO (1) did not follow legal precedents which in prior cases held that no remedy is available if no impact on the award decision is shown and (2) improperly recommended relief on the basis of alleged, but unproven, misconduct. In addition, the Air Force believes terminating the contract before all the facts are available would be premature and could result in additional costs of $60 to $300 million and operational impacts resulting from delays in receipt of the new system. The Air Force will, of course, take any appropriate remedial steps when the extent of the improper conduct alleged in the affidavit is determined.

Question: What are the potential cost and schedule impacts of this action on the B-1B RWR program.

Answer: Depending on a final decision, the impact ranges from none (continuing with the ALR-56M), to 13 months (re-competing the common RWR with schedule restrictions), to four years (full and open competition with no schedule restrictions). Selection of the ALR-56M saves the B-1B program $100 million (TY $). Delaying the selection or designating another system with schedule slips could negate this $100 million savings and/or cause an inflation cost of as much as $25-50 million. These costs do not include development of a new RWR, which could be a possibility under a full and open competition with no schedule restrictions.

B-1B ECM #1

Question: With the B-1B ECM recovery plan, when will the $20.5 billion cost cap be broken?

Answer: The Air Force projects the $20.5 billion (BY 1981 $) cost cap will be exceeded in FY 1992, but not solely as a result of the ECM recovery plan. The $20.88 billion estimate at completion for the baseline B-1B program includes the costs for the ALQ-161A "core," the RWR FSD and production, and $250 million for depot support equipment (if this amount is appropriated as requested by our FY 1990-94 budget request).

B-1B ECM #2

Question: By how much; when will legislative relief from the cap be required?

Answer: Projections are for the cost to rise to $20.5 billion (BY 1981 $) in FY 1992. We will need legislative relief prior to the obligation of the FY 1992 funds.

B-1B ECM #3

Question: How much improvement is achieved with the recovery plan compared to the current system?

Answer: The recovery plan improves consistency of the ECM system (ALQ-161A) to receive, identify, and jam the Top 11 threats. The RWR will be used to provide situational awareness to the B-1B crewmembers of other threats. The recovery plan also will significantly increase the 1122 technique capability over the current system and bring all B-1Bs up to a common configuration. We will be able to fault isolate failed ALQ-161A line replaceable units (LRUs) through the on-board central integrated test system (CITS), a capability that does not function correctly now.

B-1B ECM #4

Question: How much performance shortfall compared to the original ECM contracted baseline remains after the recovery plan is implemented?

Answer: The original system was to receive and automatically jam all SAC identified threats. The recovery plan does not provide this capability. The ALQ-161A will be tailored to operate against the top Soviet threats, and the RWR will detect most of the other threats.

B-1B ECM #5

Question: What criteria are used to determine that a correction of deficiency exists?

Answer: The B-1B contracts contain correction of deficiency (COD) clauses, which define what constitutes a deficiency. A deficiency is generally defined as a condition or supplier service not in compliance with the requirements of the contract. The COD provisions not only define deficient hardware and/or services, but also delineates the rights and responsibilities of the parties in correcting the deficiencies.

B-1B ECM #6

Question: What criteria are used to determine that the scope of the original contract is not exceeded so that expired/lapsed funds can be used?

Answer: If the correction is to bring the hardware or services up to an originally agreed to condition or requirement, it is considered within scope of the original contract. Work that is considered within scope must be funded from the appropriations used to fund the original contract, and in the same fiscal year the original equipment or service was paid for. Pursuant to specific provisions in the B-1B contracts and based on contingent liabilities established when the original work was done, monies in expired or "M" accounts must be used to pay for the corrections.

B-1B ECM #7

Question: Why did the Air Force sign concurrent development and production contracts for the ALQ 161?

Answer: Concurrent contracts were considered the most expeditious means of meeting the mandated IOC of 1986. The acquisition plan called for very tight production and delivery schedules to meet this IOC. The Air Force assessed the risk of concurrency to determine the areas of greatest risk to achieving the schedule. These were airframe, engines, radar and electronic countermeasures equipment (ECM). Based on the facts that 1) 80% of the B-1B airframe was common with the earlier B-1A, 2) the engines were variants from the B-1A and had been continually upgraded, 3) the B-1B would utilize an upgraded version of the F-16 radar which was already fielded, and 4) the ECM had been tested on the B-1A, the Air Force believed the risk to be acceptable. As a result of this assessment, contracts were signed with all four of the prime contractors (Boeing, Rockwell, General Electric, and Eaton/AIL). The decision to use concurrent contracts proved to be a prudent one. Three of the four contractors delivered on schedule. Two of the four contractors were able to deliver under cost.

B-1B ECM #8

Question: Do we now have a stable ALQ-161A configuration?

Answer: Yes, the configuration is stable, although not all aircraft have the same configuration. Part of the ALQ-161A recovery plan is to bring all 97 aircraft to the same configuration. Once the planned retrofit program has been completed (estimated in FY 1991), all aircraft will have the same production configuration.

B-1B ECM #9

Question: How confident is the Air Force that that the recovery plan can be achieved at the advertised cost and with the proposed schedule?

Answer: Our recovery plan is a prudent and technologically achievable plan (cost and schedule). Based on the ECM contractor's previous inability to deliver as promised, however, we have instituted a program based on measurable progress in the form of program milestones tied to progress payments.

B-1B ECM #10

Question: How confident is the Air Force that the advertised results of the recovery plan can be achieved?

Answer: We believe we have established the most prudent and logical program for realizing the objectives of the recovery plan. We have measurable milestones tied to progress payments and have instilled discipline into the ECM contractor's methods of operations. We will closely scrutinize all program progress and provide appropriate feedback to the process. On the basis of our experience with Rockwell and Boeing, we see our largest risk as being the CITS development.

B-1B ECM #11

Question: What decision has the Air Force made with respect to the General Accounting Office recommendation to terminate the existing radar warning receiver contract?

Answer: The Air Force has sent a letter to the GAO asking them to reconsider their decision and recommendation on this issue. We are awaiting the GAO response to that request.

B-1B ECM #12

Question: What plans does the Air Force now have for a radar warning receiver for the B-1B?

Answer: The Air Force is continuing to pursue integration of an RWR into the B-1B aircraft. At present, we are conducting the previously mentioned risk reduction studies, but have eliminated the specific ALR-56M from our current work.

AMRAAM #1

In September 1989, a decision is scheduled to be made to initiate full rate production of the AMRAAM missile.

Question: Will all the required testing and analysis be completed by that time?

Answer: All required free-flight and live-fire testing and data analysis is projected to be completed prior to Sep 1989. Captive carry flight testing should complete at least 800 hours of relevant testing with available fixes to known failure modes by Sep 1989.

Question: By that time, will the AMRAAM missile tests demonstrate the required performance in operationally realistic environment; in terms of free flight testing; live fire testing; captive flight testing?

Answer: Testing will have demonstrated performance in very operationally representative environments for free-flight, live-fire, and captive carry testing. All IOT&E will be complete with the possible exception being the third stage of Phase III captive carriage. Those tests may require more time if the fixes currently being incorporated have not been fully evaluated.

Question: Will the test have utilized the missile configuration, including the advanced software, that will be procured once the full rate production decision is made?

Answer: Yes.

AMRAAM #2

Question: Is the design of the missile complete and stable?

Answer: The design of the missile is very stable, considering the early phase of missile production. Current changes being introduced are, in general, an alternative manufacturing method, finish. or environmental screening to accommodate higher level F-15 fuselage environments.

Question: Does it meet all of the environmental qualification requirements?

Answer: With the exception of the F-15 fuselage environment which is more severe than predicted, the missile has met environmental qualification requirements.

Question: Have all of the required functional and physical configuration audits been completed? Are there any open items remaining?

Answer: All functional and physical configuration audits have been completed. There are a few open items from the large quantity of audits that were conducted. The single remaining issue of any size is the completion of the Thermally Initiated Venting System (TIVS) qualification from FSD to be incorporated prior to Navy inventory production

Question: Do we now have a stable production configuration?

Answer: A stable configuration, with the exceptions described in the first answer above, exists for missile production

AMRAAM #3

Question: Have the contractors demonstrated the ability to produce quality missiles at the required rates?

Answer: As of this date, neither Hughes nor Raytheon has ramped up to produce missiles at the required rate. In both cases, production has been paced by slow start-up to manufacture electronic hybrids and early yield problems. These problems are typical for the initial production phase of a complex weapon.

Question: What is the status of production deliveries?

Answer: Production delivery status against the modified contract delivery schedule through May 1989 is:

	Hughes Aircraft	Raytheon
Scheduled Deliveries	56	15
Actual Deliveries	33	9

Question: Have the production delivery schedules been modified? If so, how?

Answer: The production delivery schedules for both contractors have been modified to allow for recovery of technical issues and support initial operation capability. The modification of the schedules is shown as follows:

Hughes Schedule

(1988)	S	O	N	D	J	F	M	A	M	J	J	A	S	O
Original	1	2	3	5	7	9	11	13	4	4	46			
Current	1	2	0	5	2	6	5	11	24	24	25			
Actual	1	2	0	5	2	6	5	4	8					

Raytheon Schedule

Original					2	4	7	11	14	17	20			
Current					1	0	2	5	7	10	8	13	14	15
Actual					1	0	3	3	2					

Question: Is there a backlog? If so, how much?

Answer: There is a production delivery backlog as shown above. This schedule will support the planned IOC.

AMRAAM #4

Question: What is the current cost estimate for 24,000 production missiles?

Answer: The current cost estimate for 24,320 missiles is $10.137B (TY$). If initial spares are included the cost estimate is $11.592B (TY$).

Question: What is the current unit cost of the missile?

Answer: The program acquisition unit cost of the missile prior to the incorporation of the multi-year program is $0.482M (TY$). The current estimate including multi-year is $0.474M (TY$).

Question: How does this cost compare to the original baseline estimate?

Answer: The original base unit cost was $0.473M (TY$)

Question: What savings are projected with the proposed multi-year procurement?

Answer: Savings of $195.3M (TY$) are estimated due to multi-year procurement.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM #1

In February 1989, the captive carry test program was restarted aboard the F-15 using missiles from Hughes first production lot. Through the end of April 1989, about 500 flight hours were accumulated and 11 failures were recorded. In early May, the Air Force independent test group suspended its involvement in the program and it has been redesignated as a development test effort.

Question: Have all AMRAAM effectiveness and suitability requirements been demonstrated in combat-realistic tests using production representative hardware and software? If not, identify outstanding performance issues.

Answer: The Air Force independent test group and 33rd Tactical Fighter Wing have continued to actively pursue captive carry testing of AMRAAM since the early May period referenced and have now (as of 11 June 1989) completed 978 hours of captive carry testing. Six hundred forty of these hours (including the 500 hours referenced in the question) have been accumulated on the original Lot 1 missiles. The second stage of current CCRP testing is being accomplished with proposed fixes to the basic problems identified in the referenced tests. Three hundred thirty-eight (338) additional hours have been accumulated on hardware containing these fixes with two failures occurring to date. The results of these tests should provide definition of whether additional fixes are required.

There is one major area which requires operational test to verify effectiveness and that is the 4 versus 4 shot which will show AMRAAM's capability in the multiple target environment. That shot is scheduled for this summer. Additionally, there are three warhead shots. A precursor shot to 4 versus 4 has already occurred with the missile scoring a direct hit. In the suitability area the one remaining issue is the missile's reliability in the F-15 fuselage captive carry environment.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM #2

Question: Is there agreement between the development activity and the various test organizations on what the outstanding performance issues are? If not, what are the points of difference?

Answer: Yes.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM #3

Question: Is there a fully coordinated and approved test plan which outlines the issues, tests, and timeframes for the additional testing?

Answer: Yes. The AMRAAM Test and Evaluation Master Plan is fully coordinated and approved, and comprehensively addresses issues, tests, and timeframes.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM

Question: What is the current status of required additional testing, and will the tests be completed before September 1989 when the Defense Acquisition Board is scheduled to make a decision on full-rate production?

Answer: Additional free-flight testing consists of a 4 versus 4 (multi-target) and live warhead shots. The first precursor shot to 4 versus 4 has successfully occurred with a direct hit. The remaining shots are all scheduled prior to September 1989.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM #5

Question: What is the status of efforts to ensure that the missile's specifications are adequate to withstand the environment it will be exposed to on the F-15 fuselage stations and F/A-18 pylon stations?

Answer: We have completed an extensive Instrumented Measurement Vehicle captive flight test program to quantify the environment induced on the missile during F-15 fuselage carriage. We have also obtained limited flight test data on the F/A-18 sufficient to compare energy levels placed on the missile with the F-15 environments. The F-15 is the driving environment for missile qualification/specification values. In addition, we have worked with the operators to identify the frequency of occurrence of these high vibration levels. We have followed this work by instituting a ground vibration program for Hughes and Raytheon hardware to give a quick assessment of fixes being introduced to meet these high levels.

Question: How extensive will any needed changes be to either the aircraft or the missile?

Answer: At this point, no major changes are seen to be required to the missile design. Fixes are generally limited to manufacturing changes. No aircraft changes are projected to be required.

Question: When will any needed changes be incorporated?

Answer: Certain changes have already been incorporated into Lot I missiles. All other changes will be introduced as incrementally available in Lot II, and will be incorporated before Lot III.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM #6

Question: In light of the missile's poor demonstrated reliability and the reclassification of the captive carry program as a development test, does the Air Force still plan to give final approval for the third production lot in July 1989?

Answer: The Air Force will not release full Lot III production funds for missile procurement to the Program Office prior to satisfactory progress in demonstrating captive flight reliability.

Question: When will those design changes--needed to improve its reliability--be fully tested and incorporated into the missile?

Answer: Most changes are currently being tested in both captive flight and ground vibration tests. Changes should be thoroughly evaluated within the next few months. Continuous captive carriage will continue through the forthcoming fall and winter to gain a larger reliability data base. Proven changes are already being incorporated.

PERFORMANCE/DESIGN STABILITY FOR AMRAAM #7

Question: Will both Hughes and Raytheon be required to demonstrate that their production missiles have met the system reliability requirements--in the captive carry flight test program--before they receive contracts beyond low-rate production?

Answer: Yes, both contractors' missiles are in the captive carry flight test program and the fixes will be fully demonstrated irrespective of whether they are Raytheon or Hughes.

AMRAAM SCHEDULE #1

In 1985, concern over rising costs and schedule delays led to a restructuring of the AMRAAM program. The restructured program extended the development schedule from 54 to 79 months and delayed the initial operational capability date from 1986 to 1989. July 1988 was the 79th month of full-scale development.

In June 1987, the Secretary of Defense approved initial low-rate production of 180 interim design (less-than-full-capability) missiles. In May 1988, the Defense Acquisition Board recommended approval of 400 full-capability missiles for the second year of low-rate production, but did not recommend funding for the third production year which was to be the first year of full-rate production. After reviewing the results of additional tests in September 1988, the Board's Conventional Systems Committee, recommended continued low-rate production for a third production year rather than proceeding into full-rate production. The Committee also recommended reducing the fiscal year 1989 quantity from 1,240 to 900 missiles. The Board's review to consider whether AMRAAM is ready for full-rate production, now the fourth production year, is scheduled for September 1989.

Question: Was the full-scale development phase completed in July 1988 in accordance with the restructured schedule? If not when or will the effort be completed?

Answer: The last full scale development launch occurred on 30 January 1989.

AMRAAM SCHEDULE #2

Question: If contractor support is required for any residual development tasks, describe any contractual actions that have been taken or that are anticipated?

Answer: The only residual task of significance remaining is the Thermally Initiated Venting System, which is a residual requirement of the Hughes FSD contract. No contract actions have been taken or are required.

AMRAAM SCHEDULE #3

Hughes was to deliver its first production missile in September 1988; Raytheon's was due in January 1989.

Question: Were these deliveries made on schedule and are the contractors achieving anticipated delivery rates? Describe the cause for any variance between the planned and actual delivery rates.

Answer: Hughes was to deliver its first production missile in September 1988 and did so. Raytheon was to deliver its first production missile in January 1989 and did so. Neither contractor has yet achieved anticipated delivery rates. This has been due to normal problems both contractors experienced in ramping up the production of guidance sections (IF Receiver/Range Correlators), and control sections (electronic hybrids). The contractors have now shown improved yields of these subsystems and are on-track to get up to production rate and will support the scheduled IOC.

AMRAAM SCHEDULE #4

Question: Do the causes for any variances in production deliveries have any adverse implications regarding the quality or availability of missiles needed to achieve the October 1989 initial operational capability at Eglin Air Force Base in Florida?

Answer: The Initial Operational Capability (IOC) schedule continues to be targeted to October 1989, for missile deliveries. This schedule is dependent on the contractors achieving required production rates over the next few months. All hardware delivered for initial operational use at the 33rd Tactical Fighter Wing will have unrestricted use on the F-15 pylon stations, and limited use on F-15 fuselage. No roadblock has appeared which would preclude this schedule.

AMRAAM Schedule #5

Question: Earlier plans showed that AMRAAM would initially become operational in Central Europe. What is the rationale for changing the location to Florida?

Answer: Changing the AMRAAM Initial Operational (IOC) location to Eglin AFB, Florida, allows closer coordination and communication between the operational user and the manufacturer. This reduces the impact of the integration, training and supportability variances normally associated with the introduction of any new weapon. Experience gained via an IOC in the CONUS will contribute to a smoother introduction of AMRAAM into the European Theater three months later. In conclusion, Central European front line units will receive a more capable and supportable AMRAAM weapons system.

AMRAAM SCHEDULE #6

Question: Do you anticipate any training or other flight restrictions on the missiles used to establish the initial operational capability?

Answer: The only limitation anticipated will be associated with the fuselage on the F-15. Pylon carriage is anticipated to be unrestricted.

AMRAAM #1

The AMRAAM program experienced substantial cost increases during development. When the program was restructured in 1985, the estimated development and production cost had increased from $3.4 billion for 20,000 missiles to $8.2 billion for 24,335 missiles, in 1984 dollars. Congressional concern over cost increases were reflected in the National Defense Authorization Act for Fiscal Year

1987 which established a cost cap of $7.0 billion (1984 dollars) for procurement of 20,000 missiles. The Act provides that the cap may be increased to account for cost increases which result from congressional funding actions. Considering congressional funding actions for fiscal years 1987 and 1988, the cost cap has been adjusted to $7.585 billion.

The Air Force cost estimate supporting the $7.0 billion cap assumes that about $2.0 billion (1984 dollars) included in earlier estimates can be avoided by having two contractors compete during production and by redesigning many components to make them more reproducible and thereby less costly.

The current estimated cost for development and procurement of AMRAAM is about $11.6 billion in then-year dollars.

Question: Does this estimate include any cost impact to investigate and possibly change the missile to make it more reliable?
Answer: No major changes connected with reliability will be approved until the Captive Carry Reliability Program has been completed.

Question: Does it include cost increases as a result of reducing the procurement quantity for the third production year?
Answer: The estimate reflects the increases due to the reduction to a 900 missile (Air Force and Navy) program in Lot III.

AMRAAM COST #2

Question: Describe what impact, if any, current reliability concerns will have on the design, availability or savings anticipated from the producibility enhancement program?
Answer: The qualification levels for the APREP projects are being increased to cover the F-15 fuselage environments. At this time we do not have the detailed cost impacts. However, because we are making these changes prior to most of the designs being qualified, we should incur limited additional costs. At this time we do not believe this higher level of qualification will significantly change APREP unit costs. Some reduction in savings may occur because of limited delays in incorporating these APREP projects into production.

Question: Is any cost impact included in the current estimate?
Answer: No reliability impact changes are currently included in the current estimate.

AMRAAM COST #3

Question: In that the current procurement cost estimate is above the $7.585 billion (1984 dollars) adjusted congressional cap, what is being done to remedy the situation?
Answer: The AF is pursuing a number of initiatives to reduce the overall AMRAAM cost, including accelerating the introduction of APREP projects, and multi-year procurement program starting in FY 1994.

AMRAAM COST #4

The fiscal Year 1989 Appropriations Conference Committee expressed concern over a trend of rising AMRAAM unit cost and directed the Air Force to take necessary steps to lower the unit cost in 1989 and the outyears.

Question: What actions have been taken and what results have been achieved?

Answer: A multi-year procurement (MYP) program has been added starting in FY 1994 with an estimated additional savings of $195.3M (TY). Another initiative includes continued emphasis on AMRAAM Producibility Enhancement Program (APREP) projects, with each current value engineering proposal being incorporated as rapidly as possible. Additional APREP projects and Industrial Modernization Incentives Program projects are also being considered.

PROCUREMENT PROGRAMS

Question: What is the current status of the C-18 test program?

Answer: Line Replaceable Unit performance and environment qualification is essentially complete. Remaining tasks involve correction and retest of minor software deficiencies discovered during the initial testing. TEMPEST, Electromagnetic Compatibility, Survivability/Vulnerability and human factors testing are approximately 70% complete. No major hardware or software problems have been discovered. All testing is scheduled to be completed by December 1989.

Terminal level performance qualification testing is on schedule for September 1989 through February 1990. Terminal to payload compatibility testing is approximately 90% complete. We have successfully demonstrated waveform, channelization, data rates, acquisition and time tracking for Extremely High Frequency (EHF), Super High Frequency (SHF) and Ultra High Frequency (UHF) links as well as all protocols except reportback and crossbanding which will be demonstrated in June 1989.

Triservice interoperability waveform, cryptographic, end-to-end protocol, coding, interleaving and input/output device testing are complete. Additional testing is scheduled for August 1989, FY 1990 and FY 1991 to demonstrate additional data rate/interleaver combinations and operation with the Milstar satellite in FY 1991. Terminal flight testing began in October 1988 on the C-18 testbed aircraft. Ground and airborne testing consisting of end-to-end protocols, cryptographic, waveform compatibility, coding, interleaving and input/output device operation has been successfully demonstrated via the Fleet Satellite (FLTSAT) EHF Package (FEP) satellite. Additionally, end-to-end terminal operation was demonstrated utilizing Air Force Satellite Communication (AFSATCOM) narrowband, wide-band, Time Division Multiplex (TDM) and

Single Channel Transponder (SCT) modes via the AFSATCOM, FLTSAT and Defense Satellite Communications System (DSCS) satellites. Additional testing is planned for FY 1989 through FY 1992 to verify specification limits and operation with the Milstar satellite.

Question: What is the current assessment of the manufacturing risks associated with the radome that will house the antenna for the Milstar terminals?

Answer: The manufacturing risks associated with producing the radome involved the Kevlar coating sticking to the mold and the subsequent fault screening process. Both problems have been resolved.

Question: What are the plans and schedule to include the B Kits for the Milstar terminals in the EC-135R and E-4 aircraft?

Answer: We have scheduled procurement of Milstar terminals for the EC-135R aircraft to begin in FY 1993 with two terminals. Plans call for procuring 3 terminals per year thereafter until the fleet of 21 aircraft is outfitted. We are also procuring all 4 E-4B terminals during the Defense Acquisition Board approved Low Rate Initial Production (LRIP). The procurement schedule is FY 1989 - 2, FY 1990 - 1, and FY 1991 - 1.

The production and installation schedule for Milstar terminals is properly phased to support the launch. We will field the terminals according to the following priority: National Command Authorities, Commanders-in-Chief (CINCs) of Unified and Specified Commands, Attack Warning/Attack Assessment, Satellite Mission Control, etc. Fielding these 159 terminals by FY 1995 provides connectivity for the highest priority users consistent with satellite constellation buildup.

Question: What is the status of the review process for establishing the requirements for the total number of Milstar terminals?

Answer: The CINCs communication network requirements necessary to support the Milstar satellite constellation is documented in the Joint Milstar Command, Control and Operations Concept (JMCCOC) Volume I, dated June 1989 and and Vol II, dated March 1988. Network requirements are translated in numbers of terminals.

Question: When will the assessment be completed?

Answer: The JMCCOC is reviewed and updated annually

Question: What, if any, priorities have been made to establish tactical users in the Milstar network?

Answer: Validated JMCCOC network requirements have been prioritized so that tactical missions receive a significant amount of space segment resources, consistent with the CINC staff's perspective of national security requirements. While initial fielding of Air Force Milstar terminals supports the National Command Authority (NCA), CINCs, Attack Warning/Attack Assessment, the Navy and the Army will will be concurrently fielding terminals which support tactical implementation of NCA direction.

F-16

The Air Force plans to buy 150 F-16 aircraft annually for the next 4 or 5 years.

Question: How many of those aircraft will be combat coded?
Answer: Of the 150 aircraft delivered per year, 108 will be combat coded, 11 will be programmed into the backup aircraft inventory, 27 will be utilized as trainers to support the combat fleet, and four will be used to conduct testing programs.

Question: How many will be designated attrition aircraft?
Answer: The backup aircraft inventory is formed by computing ten percent of the combat coded inventory. For an annual procurement of 150 aircraft, 108 of those will be combat coded requiring a backup inventory of 11.

Question: To date, how much of the active inventory requirement has been met?
Answer: As such the Air Force does not have an "inventory requirement". The requirement to procure new aircraft is driven by force structure goals and the average age of the fleet. To support continued modernization of the Air Force's 35 Tac Fighter Wings while maintaining an average age goal of 11 years we need to procure 203 fighters of various types per year. The 150 F-16 buy supports this goal.

Question: How much of the Reserve forces' inventory requirements have been met?
Answer: The Air Reserve Component (ARC) is being modernized at the same rate as the active component. The ARC comprises a significant portion of the Air Force's 35 Tac Fighter Wings and as such has the same modernization requirements as the active units.

Question: What are the plans over the FYDP to provide F-16 aircraft to the Reserve forces?
Answer: By the end of the FYDP, 30 ARC fighter squadrons out of 45 total will have upgraded to the F-16. In the immediate years following the FYDP several more units will convert from A-7s and A-10s. By the turn of the century the ARC fighter squadrons will be in A-10s, F-15s, and F-16s with the majority being equipped with F-16s.

F-16 #6

Question: With the recommended termination of the existing radar warning receiver contract for the F-16, what are the Air Force plans for a RWR for the F-16?
Answer: On May 30, 1989, the Air Force formally requested that the GAO reconsider its recommendation. This action was taken on the basis that the GAO (1) did not follow legal precedents which in prior cases held that no remedy is available if no impact on the award decision is shown and (2) recommended relief solely on the basis of wiretap information. The Air Force believes that terminating the contract before all the facts are available would be premature and could result in additional cost and operational impacts from delays in the receipt of the new system. The Air Force will, of course, take any appropriate remedial steps when the extent of the alleged improper conduct is determined. For instance, if the Air Force concludes that it must ultimately cancel and recompete the RWR requirement, it is estimated that the additional RWR costs could range from $60 million if the recompetition is limited to Loral and Litton, to $300 million if a

full and open competition is conducted, which would include the cost of qualifying new competitor(s) RWR system(s) and costs for installing ALR 69s and then retrofitting to a new RWR. In addition, recompetition would result in a one to four year program slip depending on the acquisition strategy selected.

A-7 AIRCRAFT

Recently, it was determined that a number of A-7 aircraft have sustained wing cracks.

Question: How many aircraft are involved?
General Yates: Out of 363 A-7s in the aircraft inventory, 248 were determined to have sustained wing cracks.

Question: What is the Air Force plan for repairing the aircraft?
General Yates: The plan is to complete repairs with a depot maintenance team from Sacramento, CA. The majority of the repairs should be completed within two months.

Question: What is the cost and remaining service life for the A-7?
General Yates: The cost and extent of the remaining A-7 airframe life is at this moment uncertain. As you know, a potentially severe problem has arisen with cracks on the wings of our A-7s. At present, we are making all possible efforts to analyze the full extent of the problem. This has been given high priority and will receive our best engineering analysis possible. Time will tell the full extent of our problem. We must give the engineers enough time, data, and resources to come up with their best solution. This is where we are now: in mid-process.

Question: Is it correct that the Air Force in its force structure review is evaluating the future role of the A-7?
General Yates: Yes, we are continually evaluating and reevaluating all missions and roles of our aircraft. This ensures that we are up to date in our analysis of the threat and our planned application of our resources to best meet that threat. As to the specific concern for A-7 future force roles, our plans for present have not changed. We are, as stated earlier, monitoring the status of our A-7 wing cracks very closely and will let the process work. A rushed engineering analysis is not in anyone's best interest.

Question: Does this evaluation include the option of retiring the A-7? If so, when?
General Yates: Outyear planning calls for eventual replacement or upgrade of the A-7 fleet to meet future mission requirements. Our current evaluation will look at the timing for these options in light of the wing crack problem, mentioned above. It is giving us some concern, but we must let the jury come in on this issue. After we have all the necessary data to evaluate the wing crack problem then we can factor this information in on a future decision about the A-7.

ELECTRONIC WARFARE

In the Fiscal year 1989 defense authorization conference report, concern was expressed about the proliferation of electronic countermeasures systems. The Air Force was directed to conduct a competition of its electronic jammer pods, namely, the ALQ 131 and the ALQ 184.

Question: What is the status of the competition?
Answer: The request for proposals was issued to Westinghouse (ALQ-131 Block II) and Raytheon (ALQ-184) on March 23, 1989. Their responses were received in early May and the Air Force is in the source selection evaluation phase at the present time. The source selection authority will evaluate each offeror's response to the proposal and make a decision on the split between the two contractors. This decision is due in August 1989 with a contract award to follow shortly thereafter.

BIGEYE

Question: What is the status of the manufacturing of production configured test articles for the required operational test program?
Answer: The Marquardt Co, Van Nuys CA, is in the process of ordering material, piece parts, and subassemblies for the current metal parts contract which includes the units that will be used for the additional operational testing (OT-IIC). The first article acceptance test on the initial production units will be accomplished in the Fall of 1989.

Question: What is the current test schedule for the BIGEYE?
Answer: The additional operational test of the BIGEYE (OT-IIC) is scheduled to begin in February 1990 at Dugway Proving Grounds. It will be completed in September 1990.

Question: Have the differences between the General Accounting Office and the Department of Defense over the efficacy, realism and validity of the test program been resolved; if not, what are the remaining open issues?
Answer: We are not aware of any issues between the General Accounting Office and the Department of Defense concerning the upcoming additional operational testing (OT-IIC). The GAO has been invited to participate in the Test Plan Working Group which meets to discuss and plan the upcoming test. They have not commented on our planned testing.

Question: How will the $6.9 million requested in fiscal year 1990 be used?
Answer: The fiscal year 1990 funding for BIGEYE will be used to procure inert safe separation test vehicles for the Air Force aircraft certification and accuracy verification program (SEEK EAGLE). It will also be used to procure containers and engineering support for those items.

AC-130U

The production options on the Lockheed and the Rockwell contracts require buying at least one aircraft in fiscal year 1989 and the remaining 10 in fiscal year 1990. If these contract provisions are maintained, concurrency can not be eliminated. Eliminating concurrency could require negotiating new production contracts with both Lockheed and Rockwell after testing demonstrates a sound design.

Question: Explain the cost implications of a program schedule which sustantially reduces the concurrency of development and production?
Answer: Our initial assessment is that delaying production for 2 to 3 years would increase AC-130U program costs by up to $180 million. Support costs to keep the AC-130A aircraft flying until 1990 would also be significant.

Question: If the existing production options were exercised and design problems later surfaced in the test program, what assurances can be given that the cost to redesign, retest, and retrofit will be less than negotiating new production contracts?
Answer: The QT&E specification compliance tests and initial QOT&E will be complete before the first production aircraft is accepted. Costs to redesign, retest or retrofit any aircraft because of a specification deficiency must be borne by the contractor as required by our contract. We are also covered by warranties after the aircraft are accepted.

Question: What are the Air Force's plans for buying C-130H aircraft beyond 1990 and for what purposes? If the 11 C-130Hs to be acquired for the AC-130U program in FY 1989 and 1990 are not procured, what is the Air Force's contractual situation concerning production of C-130Hs by Lockheed.
Answer: The outyear requirements for the C-130H are for the Air Reserve Forces, Foreign Military Sales and other Service procurements. There are no Air Force contractual obligations to Lockheed beyond FY90. The eleven C-130H aircraft are not presently on contract with Lockheed Corporation. There is no government

liability for these aircraft until the appropriate production options are exercised by the government. We have contractual options with Lockheed but no obligation.

Question: Please provide a summary of the six latest AC-130U program office Monthly Acquisition Information Assessments.
Answer: During the last half of 1988, Rockwell International (RI) made slow progress in correcting discrepancies identified at the Preliminary Design Review (PDR). Failure to complete the design prior to the scheduled Critical Design Review (CDR) (January 1989) was driven in part by RI's recognition that the cost of Full Scale Development (FSD) would exceed the ceiling estimate. In early 1989 RI recommitted itself to the program and began to accelerate the development and design activities. By late March, their design began to firm up and CDR officially started in May. Although CDR is going much better than expected, and tremendous progress has been made since late 1988, program concerns remain. The principal risk was, and remains, software development. The software portion of CDR begins on 22 June 1989 and will provide much greater insight into the technical status of the program, and the degree of schedule risk.

Rockwell is contractually charged with the Total System Performance Responsibility for the AC-130U gunship modification, and as such, is responsible for choosing the systems necessary to meet the weapon system performance specifications.

Question: What were the original electronic countermeasure, weapon, and the avionic systems picked by Rockwell?
Answer: Rockwell International (RI) chose the weapon suite recommended by the USAF Gun Study, conducted prior to issuance of the Gunship Replacement Program RFP. Neither the guns nor the ammunition to be used with them has changed during the life of the program to date. In source selection RI identified equipment to satisfy performance requirements of the RFP and build their cost proposal but none of the equipment was placed on contract. Rather, performance requirements were put on contract not equipment. The major equipments used for this purpose were:

a. ALQ-184 - RFCM
b. APQ-164 - Radar
c. Ball - ALLTV
d. AP-102 Computers
e. Delco - Trainable Gun Mount System
f. ALQ-157 - IRCM
g. AAQ-17 - IDS

Question: What substitutions have been made since award of the development contract to Rockwell?
Answer:

a. ALQ-172 (RFCM) was substituted for the ALQ-184
b. APG-70 (radar) was substituted for the APQ-164
c. QRC-8402 (IRCM) was substituted for the ALQ-157

Question: Why have changes been made?
Answer: These changes were made by RI as a result of internal trade studies, to meet contract performance requirements.

Question: Will any changes require reductions in the performance specifications?
Answer: No major changes to the Air Force System Specification are anticipated.

Rockwell publicly stated it has considered stopping performance on the contract, because it was represented by the Air Force as being less complex than it turned out to be. Also, because of a mistake, Rockwell wants to reprice upwards its matrix costing system for production aircraft.

Question: What is the latest on these potential contractor actions?
Answer: In official Rockwell correspondence, and in subsequent meetings, Rockwell reaffirmed its commitment to continue performance under our contract. Rockwell's claim for a mistake in the pricing matrix is currently being evaluated.

Question: What are the Air Force plans to deal with these actions should they occur?
Answer: If Rockwell stops performance on the contract the Air Force would terminate for default and conduct a source selection to find an alternate source to complete the effort. According to the default clause the government could charge Rockwell for the increased cost of going to another source to complete the effort. If Rockwell's claim relative to the price matrix is determined to be well founded, the Program Office will initiate an Unfunded Requirement request.

Rockwell did not obtain firm prices from subcontractors and vendors before entering into the contract. Current cost performance reports indicate that the subcontractors' and vendors' costs are higher than originally estimated.

Question: Is this an indication that the production option costs will overrun the target costs. If not, please explain.
Answer: It is likely that actual subcontract costs in the production program will exceed the estimated costs Rockwell submitted in the Best and Final Offer and subsequently agreed to in the contract. However, because the production options are firm fixed priced, the Government is not contractually obligated to share the loss.

Question: What has been budgeted for the AC-130U's initial and replenishment spares on an annual basis?
Answer:

AC-130U Spares

Initial Spares	**FY89**	**FY90**	**FY91**	**FY92**	**FY93**	**FY94**
Requirements	8.9	30.1	41.1	--	--	--
Funding	8.9	30.1	41.1	--	--	--
Replenishment Spares						
Requirements	--	.1	1.3	5.5	14.6	16.8
Funding	--	.1	1.3	1.5	2.2	3.9

SATELLITE OPERATIONS #1

The Air Force is planning to launch the initial 28 NAVSTAR GPS Block II satellites between 1989 and 1994--26 on Delta II boosters and two on the Shuttle. It plans a 20-satellite follow-on buy beginning in fiscal year 1991. The satellites have an estimated six-year operational life. The constellation requires 24 on-orbit satellites, including three spare launch vehicle, the Air Force terminated its contract for 28 PAM-DII upper stages for use with Shuttle launches but agreed to accept delivery on 16 of them at a cost of $106 million.

Question: What does the Air Force plan to do with the 16 PAM-DII upper stages if it is planning only 2 Shuttle launches?
Answer: During the recent Amended Presidents Budget the remaining two GPS missions on the Shuttle were deleted and moved to the Delta II booster. This was done to reduce the cost associated with the Shuttle launches that were scheduled in FY 91. A program stretch out of the GPS launch profile to provide improved mission coverage in FY 95 and FY 96 allowed deletion of the Shuttle missions. Boosters are available because GPS replenishment launches will now be required later, thus freeing up boosters previously required for replenishment. The 28th launch will now occur in FY 95. Initial deployment of the first 21 operational GPS missions will be attained in FY 93 instead of FY 92. The PAM-DII upper stages that were for use on the Shuttle are currently unassigned. The Air Force is studying the options for disposition of the 15 delivered PAM-DII. The current PAM-DII vehicles lifetime expires four years after delivery.

Question: Could the Air Force be launching more GPS satellites on the Shuttle and acquiring less Delta IIs, especially for the planned 20-satellites follow-on buy?
Answer: As stated above, the Air Force has removed all GPS missions from the Shuttle. The follow-on Delta II procurement scheduled for FY 90 will now be based on a procurement of a launch service similar to the Atlas II contract. This procurement will consist of yearly options to procure a variable quantity of launches based on mission requirements. The options are exercised two years prior to the required launches when full funding of the mission is required. This provides the flexibility required to adjust for mission variances due to early mission failure, longer than expected

mission duration, or new requirements. For Shuttle launch services, the Air Force must commit 36 months prior to launch with a NASA minimum of 18 months lead time required to launch. Because of the size of the GPS on Shuttle, it must be mixed with other cargo elements to obtain a full mission. GPS was experiencing difficulty in obtaining and maintaining a Shuttle launch due to competition with higher priority payloads and the limited number of Shuttle launches available.

Question: What are the specific cost tradeoffs for using a greater mix of the Shuttle and Delta II for launches considering the sunk costs and storage costs of the PAM-DIIs, the cost of the Delta IIs and additional PAM D upper stages for the Delta IIs, launch operations, modifications to GPS satellites from Shuttle to Delta II compatibility, and other pertinent costs?

Answer: Shuttle launches for GPS require a third of a Shuttle payload bay, and until 1991 would cost the Air Force $38 million (1986 dollars) for each mission. Cost for launches beyond FY 91 have not been determined. At full cost recovery the Air Force estimates the Shuttle could cost approximately $80 million per GPS launch (1986 dollars). GPS launches on the Delta II booster cost about $37 million. The sunk costs associated with the PAM-DII are sunk costs that do not play in the current equation. In addition, the vehicle lifetime expires four years after delivery. The upper stage of the Delta is an integral portion to the Delta II vehicle and as such is procured as portion of the Delta II vehicle. Modification of the GPS to go back to Shuttle is not required since a requirement in the development of the Delta II forced the Delta II payload interface to be compatible with the Shuttle/GPS interface.

SATELLITES #2

In fiscal year 1988, the Navy entered a multiyear contract with a satellite manufacturer to acquire up to 10 UHF follow-on satellites, including the launch vehicles and launch services for the satellites. The Navy will accept delivery of the satellites only when they are individually on orbit and operating. This turnkey approach is different from other satellite systems where the Government has acquired the launch vehicle and launch services for the satellites.

Question: Has the Air Force studied the cost and operation implications of the Navy's turnkey-type approach to launch acquisition?

Answer: Following the Defense Acquisition Board review of the Navy's UHF Follow-on program in July of 1988, the Navy was tasked to review the option of using the Air Force Atlas II launch vehicle. In support of OSD inquiries on this subject, the Air Force has conducted an independent assessment of using the Atlas II to launch the ten UHF Follow-on spacecraft under our current contract. This assessment was made by comparing the Navy's UHF Follow-on contract and its costs and requirements to the Atlas II program costs and requirements. The results of this assessment showed an average $60.9 million per vehicle cost for the purchase of ten Atlas II vehicles to support the Navy UHF Follow-on from FY 92 through FY 97. The Navy contracted cost, taken directly for the Navy contract, for the required launch services is approximately $72.9 million per vehicle. I believe the Air Force option will save the Navy $120.4 million over the duration of the initial launch program if no failures occur.

Cost savings are reduced as failures occur due to differences between the Navy and Air Force reflight guarantees. For the Air Force contract a successful flight of the booster is guaranteed. Upon experiencing a failure, the contractor is responsible for conducting the investigation, correcting the problem, and providing another launch vehicle at no additional cost. In the Navy contract the guarantee is on the success of the satellite on orbit, and costs for the launch vehicle are not paid if the mission is a failure. This results in a very similar arrangement for the actual launch vehicle. The difference occurs on the fact that the Navy also has an 80% replacement guarantee on the satellite if the launch mission is a failure. Because of this satellite replenishment guarantee, the total cost of replacement is less for the Navy due to the funding of 80% of the replacement satellite cost by the contractor. As launch failures increase, the Air Force Atlas II option becomes less cost effective due to higher costs to the Government for replacement of the satellite. The following table illustrates the savings relationship between the Navy and Air Force.

Failures	UHF F/O	Atlas II	Difference
0	729.4	609.0	(120.4)
1	740.1	662.6	(77.5)
2	750.8	716.2	(34.6)
3	761.6	769.8	8.2

These costs are based on the replacement cost of the satellite in case of failure. The Navy is reimbursed 80% for the loss of the satellite and the AF has no satellite replacement guarantee. Both services have a booster replacement in case of failure. The cost of the UHF-FO satellite is $56.3 million (80% = $45.04 million). The historical success rate of an Atlas vehicle is 93% or approximately 1 in 20. Based on the UHF-FO mission requirement of ten launches, we could expect no more than one failure in the ten UHF-FO missions. With this failure rate a savings of $77.5 million would be expected if the Air Force Atlas II were selected as the launch vehicle for the Navy UHF-FO.

In my opinion, the key difference between the Navy and Air Force approaches is the inclusion of the satellite in the procurement of a turnkey system. Also the Navy gets very little insight into the launch readiness of the booster due to the fact that the booster launch service is subcontracted by Hughes Aircraft and is strictly a commercial launch. On the Air Force side, a thorough launch readiness process is maintained by the Air Force for the launch vehicle and a prelaunch verification is provided to the payload manager prior to launch. The Navy has their own views on this subject. This fall they will present to the Defense Acquisition Board their findings on the use of the Air Force Atlas II for launch of the UHF Follow-on. The Air Force evaluation will be provided to the Navy for use in their evaluation.

Question: What consideration has the Air Force given to using the turnkey approach to launch acquisition? What decisions have been made, if any, and what specific operational and cost factors and tradeoffs did the Air Force consider as the basis of its decision?

Answer: The Air Force developed a procurement of a launch service with the Atlas II program in FY 88. In the Atlas II program the Air Force buys the Launch vehicle after a successful deployment of the payload to the appropriate orbit, but has not relinquished its management role in vehicle design and production, or its mission management role in the actual launch activity. The Air Force Atlas

II procurement approach to launch services is being expanded within the Air Force active boosters and will be incorporated in the FY 90 Delta II follow-on contract. The Air Force approach provides a cost savings due to the competitive procurement environment that exists between the medium launch vehicle contractors. The Navy has taken the procurement of a service even further with the procurement of a turnkey satellite from the contractor, including the launch service. The Navy has turned all activity over to the contractor and has reduced their participation in the process to a minimum, relying on the penalty clauses within the contract to provide assurance of success. The Air Force position on a total turnkey approach is that the benefits gained through Government participation are required in the critical area of space launch. In addition, the Air Force has been able to obtain launch services at a cost less than current commercial launch services. Booster costs can range from $35 million to $200 million per launch depending on the booster required to meet payload weight requirements. They contribute only 25 to 45% of the total stack recurring cost. Satellite costs are usually higher due to technical complexity of the systems and efforts to make the systems as reliable as possible due to the inability to repair failed systems. This can result in a total mission cost from $70 million per launch up to $500 million per launch. With these high value resources at risk and the cost and schedule constraints that prohibit having even a single backup booster or satellite available, any failure can have significant impact to national security satellite missions that cannot be recovered immediately upon a launch or satellite failure. The Government oversight guarantees the satellite and booster are ready, and provides increased assurance of mission success.

SATELLITES #3

One reason DOD has reverted to primary reliance on expendable launch vehicles (ELVs) instead of the shuttle for space access was to avoid losing launch capability through failures in a single system. DOD now has a new mixed fleet of boosters coming on line.

The Committee understands the Air Force plans to have dual launch capability for satellite systems where practical and economical. For example, in a report to Congress the Air Force says the DSCS could be launched on either the Atlas II or the Titan IV, although the Air Force is currently scheduling launches only on the Atlas II. Other systems such as DMSP and Milstar are currently scheduled for launch on single launch systems (Titan II and IV, respectively) and all but two NAVSTAR GPS launches are scheduled for launch on the Delta II.

Question: For which systems have design changes been initiated so that switches of booster systems can be practically accomplished when needed and what are the additional costs to do so for each system being so designed?

Answer: The DMSP program completed design changes to transition from Atlas-E to Titan II for vehicles S12 through S14. Vehicle S12 maintains dual compatibility between Atlas and Titan. The cost for converting the three vehicles was under $10 million. The Atlas II program has been directed to integrate GPS on Atlas II as a back-up to Delta II. This work is budgeted for $6 million and will define the costs of any hardware modifications that may be needed. The DSCS program is being considered for dual capability on the Atlas II and Titan IV. The additional cost for the Titan IV integration has been estimated at $35 million non-recurring and $15 million per launch recurring on the Titan side of the interface. On the DSCS side of the interface, the cost of integration with the Titan IV is estimated at $5.2 million. This integration cost is low because of the previous integration with the Titan 34D.

Question: If GPS, DSCS or other systems needed to be rescheduled on the shuttle or other ELVs, could the switch to alternative vehicles realistically be accommodated, considering physical modifications to payloads, fairings, and upper stages; complications to launch scheduling; vehicle commitments to other payloads; and the cost to do all this?

Answer: Should a switch to an alternate vehicle be needed for these programs it could be readily accommodated for the DMSP and GPS programs. The integration costs are reasonable, and the capacity of the vehicles and facilities can handle the increased workload. The DSCS program transition to Titan IV would be difficult, not only because of the higher cost of integrating with the Titan IV, but primarily because of the other high priority demands on the Titan IV. The Titan IV's current launch schedule requirements strain its capacity now. By the mid 1990's the projected launch demand will saturate the Titan IV's capacity and resiliency.

Question: If switching vehicles after a problem arises for a type of vehicle is difficult, specifically how does the switch to ELVs alleviate the risk of losing launch capability for any satellite system if problems arise with its primary assigned booster system? Potential problems could include design problems, pad destruction, or production interruption for various reasons.

Answer: Average down-times for US ELVs have ranged from three months for Delta to six months for Titan. This is typically less than the time required to re-integrate a payload onto an alternate booster and is comparable to the launch call-up time for current ELVs. The limited down-time occurs as a result of maintaining a continuing production capability for the ELVs, which not only provides the engineering and production base to troubleshoot and fix any problems found but guarantees the availability of a rapid replacement for the lost capacity. This is in sharp contrast to dependence on a small fleet of manned, reusable systems like the Shuttle. Not only did the restoration of Shuttle operations require nearly three years after its first failure, but the replacement of the lost orbiter (one fourth of the fleet capacity) will require six years. Thus, the switch to ELVs from the Shuttle limits the extent of the anticipated down-time, even if the potential problems cited were to occur.

Question: What contingency plans does the Air Force have for launching satellites in the event of problems with their scheduled launch systems and how will they overcome the potential practical problems of switching boosters?

Answer: Our primary contingency plan is to recover to the ELV that is the scheduled launch system. We have programmed redundant launch pads to avoid extended down times due to loss of facilities. As a secondary contingency approach, the Air Force will attempt to preserve dual compatibility where it exists as a result of the transition of payloads off the Shuttle. Examples include DSP, GPS and DSCS. In addition, as mentioned above, we are maintaining a backup capability for DMSP on Atlas-E and Titan II and examining backups for GPS on Atlas II and DSCS on Titan IV.

Question: What are the specific operational and cost considerations, risks and tradeoff regarding such contingency plans?

Answer: As mentioned above, we are developing the cost tradeoffs of maintaining backup launch capabilities for GPS and DSCS. The operational tradeoffs are negligible for the Atlas-E, Titan II, and Atlas II vehicles but significant for the Titan IV and Shuttle. Both the Titan IV and the Shuttle launch capacity are fully -if not over- subscribed now. Emergency transition of an ELV payload would require difficult priority decisions. Both have a long integration and launch call-up lead time. Emergency transition of an ELV payload to either would be considered only in the unlikely event of an extended downtime of the primary launch vehicle. Finally, to backup DSCS on the Shuttle would require either substantial redesign of DSCS or reinstating earlier safety waivers which were revoked as a result of the recovery from the Challenger failure.

SATELLITES #4

In its Fiscal Year 1990 budget submission, the Air Force shows a production capacity of five Titan IVs a year with a maximum production capacity of 10 a year. However, in a March 1989 report to the Congress the Air Force is showing launch rates for Titan IVs equal to or exceeding five a year from 1990 through 2000.

Question: What is the realistic sustained production rate the Titan IV contractor can maintain and for what period of time?

Answer: The current limits on the Titan IV production capability are the solid rocket motors (six per year) and the payload fairing (six per year). With the new solid rocket motor vendor (Hercules), the capability to produce solid rocket motors will be expanded to twelve per year. The payload fairing capacity is being expanded with added facilities to ten per year. In 1992 with those modifications and the new vendor, the realistic production rate of Titan IV will be ten per year with a surge capacity (except in payload fairings) of twelve per year. The realistic launch rate is also dependent on launch pads and supporting launch processing facilities. Based on Air Force studies, the maximum realistic launch rate at Cape Canaveral is three per year (FY 1989) and at Vandenberg is two per year (FY 1990). Two launch pads and added processing capabilities are under development to increase the maximum realistic launch rate at Cape Canaveral to six per year (FY 1992) and at Vandenberg to four per year (FY 1996).

Question: Based on these production rates and Air Force acquisition plans, what number of boosters will be realistically available each year through 2000?

Answer: Titan IV production and launch capacity projections are as follows:

Time Period	Production	Launch
1989 - 1990	6/year	3/year
1990 - 1992	6/year	5/year
1992 - 1996	10/year*	8/year
1996 - 2000	10/year*	10/year

*12/year (excluding payload fairing)

Question: Is the combination of inventories and production rates sufficient to meet DOD's planned launch needs?

Answer: After extensive review of both DOD and projected NASA launch needs with full consideration of any commercial Titan production/launch, the Air Force has concluded that adequate production capacity is currently planned to be available to meet the users needs. The ability to sustain the launch rates needed through the year 2000 with Titan's reliability and down time characteristics is about three fourths of the projected requirement. This leaves the Air Force with a shortfall in Titan IV launch capability that is in a manageable range. To achieve sufficiency will require the resiliency improvements of the ALS Program.

Question: What contingency plans does the Air Force have if the contractor cannot meet the required production rate or if problems develop with Titan IV that delay production and/or launch schedules?

Answer: The Air Force maintains a System Procurement Office (SPO) at Space Systems Division that is responsible for oversight of the Titan IV contractor. With independent technical support provided by Aerospace Corporation, the Air Force SPO tracks contractor performance and corrects production and technical problems as they occur. Also, the Air Force maintains a test group at each launch site to track launch preparations and monitor contractor actions. Thus, the Air Force plan to insure the contractor meets its required production rate and launch schedule is to maintain a high level of technical supervision and oversight to detect and correct problems at an early stage. We are also in a position to participate in any post failure corrective actions to insure failure cause is identified and corrected in order to gain the confidence required to return to launch from any failure in the shortest possible time.

SATELLITES #5

In the March 1989 National Space Launch Program report to Congress, DOD indicated that the Air Force is planning to launch one of the SDI systems on the Atlas II on the West Coast. The report indicated, however, that there are no specific plans to provide an Atlas II launch capability at Vanderberg AFB.

Question: How and when does the Air Force plan to provide Atlas II launch capability on the west coast and how much is it going to cost to add the Atlas II capability?

Answer: The SDIO payload referenced in the National Space Launch Program Report to Congress is the Space Surveillance and Tracking System (SSTS). It will require deployment of SSTS satellites beginning in FY 1996. Current launch planning uses the Atlas II vehicle to accomplish this deployment. An Atlas II launch capability on the West Coast is not budgeted at this time. If Atlas II remains the launch vehicle for SSTS, a launch capability on the West Coast must be developed. Initial estimates for modification of Space Launch Complex 3 East, for an Atlas II capability that were used in providing cost figures for the Report to Congress, were $130 million spread from FY 93 to FY 94. Refinements since that time have reduced the cost to $105 million. The Atlas II program office believes that this launch pad modification cost can be reduced significantly under a competitive launch procurement. The addition of solid rocket motors, similar to those used on the Delta II, must be added to the Atlas II to provide the required lift. This version of the Atlas vehicle is the Atlas IIAS and is under development by General Dynamics for its commercial program. No other medium class launch vehicle has the lift capability to support the SSTS mission.

C-17

Question: What are the major development and production start-up problems that currently face the C-17 program? What has been the cause(s) of these problems and what is the Air Force and Douglas Aircraft doing to solve these problems?

Answer: Delays in the delivery of initial builds of the mission computer (MC) software by Delco and electronic flight control system (EFCS) hardware and software by Honeywell have resulted in approximately a four-month delay in the Douglas Aircraft Company avionics integration effort. This will compress the integration schedule and cause juggling of development and production hardware to complete integration testing. EFCS hardware and software delivery for the initial build has slipped from May 1989 to December 1989 to allow for adequate subsystem integration at the Honeywell facility. Initial installs for the EFCS and MC may use development units to accomplish functional checkout of form/fit and electrical interface. The flight development unit (FDU) delivery delays may require out-of-place installation to upgrade hardware prior to first flight. To reduce the impact of these problems, incremental software builds are being utilized to perform integration tests on early versions of hardware. Initial integration tests can be completed without fully functional software. Hardware and software deliveries for aircraft P-5 and subsequent aircraft should be on schedule by 3rd Quarter FY 1991.

We understand that there have been delays and other problems with assembly of the development aircraft.

Question: What is being done to solve these problems and ensure that sufficient aircraft will be delivered to start the flight test program on schedule?

Answer: Tooling and fabrication capacity in key areas of Douglas plants has been exceeded by the demands of numerous aircraft programs (C-17, MD-80, MD-11, T-45). To the extent that this shortfall was unanticipated, it has caused disruption to production and procurement planning. This has been aggravated by the design changes spawned by weight reduction efforts. Numerous parts and tools that were originally planned for in-house fabrication at Douglas are now being contracted out. This requires added leadtime and has caused significant parts shortages in assembly. The Air Force has given Douglas a facilities contract for Air Force Plant 85 in Columbus, Ohio. Douglas has purchased the many modern machine tools that Rockwell installed there for the manufacture of B-1B aircraft structure. This represents a major new capacity addition that should solve Douglas capacity problems in the mid and long term. First production from Columbus occurred on June 9, 1989. In the short term, major packages of work have been awarded to other aerospace companies and to other McDonnell companies with excess capacity. In addition, parts shortages have had a stronger initial effect than might otherwise be expected because the high level of automation in many C-17 assembly operations demands that all parts for a given subassembly be available to begin work on that subassembly. Once begun, assembly operations have been unusually smooth due to the effectiveness of the C-17 assembly team concept, extensive automation, and the low level of fitup problems experienced with the parts. Capacity additions, extensive subcontracting, and aggressive shortage management efforts are underway to reduce the parts shortage level. A variety of work-around plans and out-of-station installations are being pursued to minimize the impact of shortages that do occur. We anticipate that the assembly schedule will be completely recovered by the fifth production aircraft, and we forecast no impact to the Operational Readiness Evaluation, IOC, or IOT&E. A major factor that bodes well for the future is Douglas' dedication to the principles of total quality management (TQM). On February 13, 1989, they announced a sweeping reorganization and reorientation to put the principles of TQM into practice in dealing with the problems they have been experiencing on all of their major programs.

The C-17 is experiencing problems with developing the mission computer and the electronic flight control system. We understand these problems involve hardware and software development, an area that has been the cause of extensive problems on many weapon systems.

Question: What are the specific problems related to the development of the mission computer and the electronic flight control system?

Answer: Delco's software development for the C-17 mission computer is behind the subcontract schedule required by Douglas Aircraft Company (DAC). The software schedule difficulties resulted primarily from Delco Electronics underscoping the effort and, therefore, the resources required. The schedule difficulties were compounded by DAC not adequately defining the software requirements and baselining them in documentation with Delco. This has created a contractual issue between the two companies. DAC provided a status briefing to the program office in early June 1989, and resolution is expected within the next few weeks. First flight, now scheduled for December 1990, will not be impacted by this problem.

Honeywell's software development for the electronic flight control system is similarly behind the subcontract schedule required by DAC. The schedule difficulties were caused by a design change in 1987 and compounded when Honeywell underestimated the magnitude of the effort required--both in manpower and cost. In March 1989, DAC and Honeywell established a revised delivery schedule along with other contractual commitments. The revised schedule with planned work-arounds will support a December 1990 first flight.

Question: How have these problems affected the overall avionics development effort? How have these problems affected the C-17's assembly schedule? What is being done to correct these problems? When do you expect to solve these problems?

Answer: The problems associated with the mission computer and electronic flight control system (EFCS) have affected the overall avionics development effort. We have had independent teams review the mission computer development schedules and make recommendations. Douglas Aircraft Company (DAC) and Delco have replanned the effort and committed to continue the technical development and work the contractual issues separately. The mission computer software critical design review was completed on April 14, 1989. DAC and Delco are working an integrated Delco development and DAC integration schedule incorporating the delays in the software needed to support the first flight of the C-17 and the flight test program. Delco has also advised DAC and the program office that they are having supplier problems that will slip delivery of flight development units for integration testing. We anticipate that these development problems should not affect P-5 which is the final configuration aircraft and is the first C-17 to be delivered to Military Airlift Command. With regard to EFCS, McDonnell Douglas and Honeywell have signed a memorandum of understanding that outlines specific schedules to support hardware and software development/integration. However, the August 1990 first flight will slip to the December 1990 timeframe.

Question: In light of these problems what is the likelihood that the first flight will occur in August 1990 and that the subsequent flight test program will be completed as planned?

Answer: August 1990 is not a likely first flight date. We anticipate a December 1990 first flight and are working to that date. October 1991 delivery to Charleston Air Force Base, South Carolina, initial operational capability (IOC) by September 1992, and operational readiness evaluation (ORE) by November 1992 are achievable with a December 1990 first flight.

We understand that the first flight could slip from August 1990 to December 1990.

Question: What impact would further delays have on program milestones?

Answer: Delays beyond December 1990 will cause corresponding slips in Charleston AFB activation, initial operational capability, and the operational readiness evaluation.

Question: If the procurement rate for the C-17 was reduced, would this decrease the risk to the program that is caused by these development and production problems?

Answer: Program risk is controlled by our event based contract award concept and our extensive warranties. Reducing production rate would have little impact on risk but would delay the initial operational capability, increase costs, and impact the warranty provisions.

We understand that the current procurement rate is 4 aircraft in FY1989, 6 in FY1990, 10 in FY1991, 20 in FY1992, and a peak of 29 in FY1993.

Question: What alternative procurement rates has the Air Force studied for C-17 low rate initial production and full rate production? How do these alternatives and planned production rates compare to the C-17's optimum and minimum economic production rates on a yearly basis?

Answer: Refer to "Report on Alternate Production Rates and Multiyear Procurement for the C-17" submitted to the Chairman, Committee on Armed Services on May 23, 1989, by the Deputy Secretary of Defense. This report was requested in the Joint Explanatory Statement of the Committee of Conference on the FY1989 National Defense Authorization Act.

Question: What is the impact of these different procurement rates on total program acquisition costs (RDT & E, Procurement, Milcon)? What are the major components of any cost increase?

Answer: Refer to "Report on Alternate Production Rates and Multiyear Procurement for the C-17" submitted to the Chairman, Committee on Armed Services on May 23, 1989, by the Deputy Secretary of Defense. This report was requested in the Joint Explanatory Statement of the Committee of Conference on the FY1989 National Defense Authorization Act.

Question: What is the impact of these different procurement rates on estimated cost savings from multiyear procurement and the timing of multiyear procurement?

Answer: Refer to "Report on Alternate Production Rates and Multiyear Procurement for the C-17" submitted to the Chairman, Committee on Armed Services on May 23, 1989, by the Deputy Secretary of Defense. This report was requested in the Joint Explanatory Statement of the Committee of Conference on the FY1989 National Defense Authorization Act.

Question: What is the impact of these different procurement rates on the C-17's FY1990 and FY1991 funding requirements (RDT &E, Procurement, Milcon)?

Answer: None.

Question: How would a change in procurement rates affect current production efforts and plans? For example, how would it affect C-17 tooling requirements?

Answer: Refer to "Report on Alternate Production Rates and Multiyear Procurement for the C-17" submitted to the Chairman, Committee on Armed Services on May 23, 1989, by the Deputy Secretary of Defense. This report was requested in the Joint Explanatory Statement of the Committee of Conference on the FY1989 National Defense Authorization Act.

Question: What would be the impact of procuring 4 rather than 6 aircraft in FY1990 on funding requirements, program acquisition cost estimates, and achieving program milestones as currently scheduled? Specifically, what would be the impact on achieving IOC and the full-rate production decision?

Answer: Procuring four aircraft instead of six in FY1990 would reduce the requirement in this fiscal year. The extent of reduction is pending review and analysis of the FY1990 proposal. If a total of 210 aircraft is still procured, the slip of buying these two aircraft would result in an overall higher acquisition cost due to added inflation and loss of learning due to the slower buy rate. Additionally, slip of these two aircraft would delay IOC, ORE and the III B decision.

Question: How would a change in the procurement rate affect the warranty provisions of the contract?

Answer: There are essentially four categories of warranties on the C-17:

1. Fleet reliability, maintainability, and availability (RM&A)
2. Contractual specification conformance, design integration, the material, and workmanship
3. Installation of parts
4. Design information

All warranties, except fleet RM&A, take effect upon delivery (DD250 action) of each item to the Air Force. Therefore, they would not be affected by a changed procurement rate. The warranty would simply begin on each item as it is delivered.

However, the fleet RM&A warranty is restricted by the time available to identify defects. Defects must be discovered within 90 days after the Operational Readiness Evaluation (ORE) but not later than 180 days after Initial Operational Capability (IOC). For warranty purposes, IOC is defined as delivery of 12 production aircraft. There will be no affect on the warranty if both IOC and

ORE slip concurrently. However, if the ORE remains constant and IOC slips, the time period for the warranty coverage is shortened.

Question: How would reduced procurements during low-rate production affect the timing of a full-rate production decision?
Answer: Reduced procurement would delay the required delivery of 12 aircraft to Military Airlift Command which is now scheduled for September 1992. Such a delivery delay would then cause a delay in initial operational capability (IOC) and the successful completion of the operational readiness exercise (ORE), which is required before proceeding with Milestone IIIB, now scheduled for March 1993.

Question: How would a change in procurement rates affect the achievement of the 66 million-ton-mile goal?
Answer: The C-17 program is the final phase of the Air Force Airlift Master Plan to achieve 66 million-ton-miles per day strategic airlift goal. Under the current plan the last C-17 will be funded in FY 98 and delivered in FY 00, enabling the Air Force to reach the 66 million-ton-miles per day fiscally constrained current goal. If the procurement rate for the C-17 were changed, but not the total procurement of the program (210 C-17s), the Air Force would still achieve the 66 million-ton-miles per day goal. If the C-17 procurement rate were accelerated, then the Air Force would reach 66 million-ton-miles per day fiscally constrained current goal earlier than currently planned. If the C-17 procurement rate were slowed, goal achievement would similarily be stretched.

We understand that the currently projected operating weight of the C-17 is about 268,667 pounds and that the range requirements begin to be negatively affected once the aircraft's weight reaches 269,300 pounds.

Question: Has the weight stabilized at this level? How much more weight growth do you anticipate? If the estimated weight exceeds 269,300 pounds what can be done to minimize the impact on the aircraft's performance?
Answer: The projected operating weight (OW) is stabilizing. The projected OW in Nov 88 was 268,667 pounds, and the current projection as of May 89 is 269,447 pounds. The contractor has an active weight reduction program which has identified and incorporated over 20,000 pounds of savings, and they are continuing to incorporate weight reductions.
A minor breach of the SAR payload/range parameter has been reported, based on the current projected OW. All aircraft are required to meet performance requirements, and weight is not a specific requirement under the C-17 contract. The contractor, Douglas Aircraft (DAC), has the responsibility and capability to design the aircraft to meet performance. Actual weapon system performance will be measured during flight test.

Question: If the estimated weight increases and performance is adversely impacted, how will this affect the C-17's contribution to meeting the 66 million-ton-mile goal? Will additional C-17s be required to meet the goal? If additional aircraft are not needed, how will the goal be met?
Answer: Our aggressive weight management program has arrested the weight growth problem, and we foresee no impact on the C-17's contribution to the 66 million-ton-mile goal. We do not envision the need for any additional C-17 procurement beyond the 210 currently programmed.

Question: We understand that the Air Force plans to incorporate defensive systems in 106 C-17s. Why are they needed?

Answer: A defensive systems suite on the C-17 will enhance the capability of the weapon system to operate and survive in a medium threat environment.

Question: Why does the Air Force plan to install them in only 106 of the 210 C-17s?

Answer: Current development and production plans for incorporating defensive systems in the C-17 center around the Program Management Directive requirement for the fiscally limited 106 aircraft minimum with possible options for up to 210 aircraft. Current estimates indicate a possible authority to proceed date of April 1991 for the start of the engineering development effort for installation of defensive systems. This equates to having installation on the production line as early as model #P-105.

Question: How will the employment of the balance of the fleet be limited because they do not have defensive systems?

Answer: While the balance of the C-17 fleet can be employed in the medium threat environment, it will do so at an increased risk.

Question: What specific systems is the Air Force planning to install in the C-17? Describe the current development and production plans for incorporating defensive systems in the C-17.

Answer: The Air Force is currently evaluating Government furnished equipment (GFE) items for installation in the C-17. The evaluation includes radar warning receivers, missile warning systems, and countermeasures dispensers capable of achieving the performance required for the increased survivability of widebody aircraft in airlift mission scenarios. Specific equipment components are being evaluated for their specific installation performance against a technical requirements document.

Our plans, per Program Management Directive (PMD), are to incorporate defensive systems in the C-17. However, we are fiscally limited to 106 aircraft, but we have options for all 210 aircraft. We plan on placing these systems on C-17s moving on the assembly line no later than aircraft number 105. Those aircraft not receiving the system on the assembly line will be retrofitted if the option for all 210 aircraft is exercised. Current estimates indicate an authority to proceed date of April 1991 for the start of the engineering development effort for installation of defensive systems.

Question: Is the Air Force considering expanding or enhancing the defensive systems in the future? What is the estimated cost for these changes?

Answer: The Air Force's current plan is to install a defensive system on the assembly line on the last 106 production C-17s. This plan also calls for the other 104 aircraft to be modified by a preplanned product improvement program. All 210 installations will be accomplished through an engineering change proposal (ECP). For economy, the ECP will be designed to install as many as possible on the assembly line but begin no later than aircraft number 105. All others will be retrofitted. A rough order of magnitude estimate for this ECP is $437 million. There are no planned enhancements to the C-17 defensive system, but the Air Force will consider enhancements as the threat evolves.

Question: We understand that the Air Force plans to use the C-17 in a medium threat environment. What constitutes a medium threat environment? Describe the situations where the C-17 would be operating in a medium threat environment.

Answer: A medium threat environment is defined in the SOC as "low threat weapons (small arms, light optically sighted anti-aircraft artillery up to .51 caliber equivalent weaponry) plus optically aimed AAA heavier than .51 caliber and man portable, shoulder fired weapons. May include more sophisticated threats employed in a dispersion pattern which makes avoidance of the threat possible with proper tactics/or defensive equipment." This environment definition was used in the Military Airlift Command C-17 Defensive Systems Study and was validated by intel and the DIA as presenting the expected threats to be encountered. Situations where a medium threat would be encountered vary with the scenario.

Question: Has the Air Force identified the impact that the absence of defensive systems will have on the C-17's ability to operate in a medium threat environment and fulfill its mission requirements? What is the impact?

Answer: The C-17 will significantly contribute to our military's ability to mass forces quickly and decisively. This capability, however, is not without risk. The C-17 is being designed to operate in a more threatening environment than current strategic airlifters. The C-17 System Operational Concept (SOC) states that the C-17 will operate in a medium threat environment which is typically the brigade rear area (BRA). The Army places the BRA approximately 20-40 kilometers behind the forward line of troops (FLOT). The Military Airlift Command C-17 Defensive Systems Study results indicated a significant improvement in aircraft survivability as defensive capability was increased.

Current development and production plans for incorporating defensive systems in the C-17 center around the Program Management Directive requirement for the fiscally limited 106 aircraft minimum with possible options for up to 210 aircraft. Current estimates indicate a possible authority to proceed date of April 1991 for the start of the engineering development effort for installation of defensive systems. Possible effectivity to the production line could be as early as P-105.

Question: If a C-17 does not have defensive systems, how will this affect its ability to operate in a medium threat environment?

Answer: The C-17 will be able to operate in a medium threat environment. Although proper combat tactics will enable operations in a medium threat environment, future successful operations will be enhanced by defensive systems capability.

Question: Will there be limitations on its ability to operate?

Answer: The C-17 will be able to perform its operational missions in the medium threat environment. Defensive systems will enhance the C-17's survivability in a medium threat, not its operational capability.

Question: How will these limitations affect its direct delivery rate?

Answer: Many locations where the C-17 direct delivery capability will be employed are not expected to be in a medium threat environment; thus we expect no effect on the direct delivery rate. For those direct delivery sites as well as other theater operations in a medium threat environment, any airlifter without defensive systems will operate at an increased risk.

Question: If the C-17 does not have defensive systems, how will the sortie rate be affected?
Answer: The C-17 sortie rate is independent of the defensive systems on the aircraft. Therefore, the full C-17 sortie rate can be productively used without defensive systems, but it will assume a higher degree of risk when operating in the medium threat environment.

Question: If the C-17 does not have defensive systems, how will this affect the achievement of 66 million-ton-mile goal?
Answer: 66 million-ton-miles per day is a fiscally constrained goal for strategic airlift capability. It is a measurement of the U.S. ability to move cargo by air and is independent of the threat environment. C-17 defensive systems will enable the aircraft to operate more successfully in a medium threat environment. However, without defensive systems, the C-17 will still enable the Air Force to achieve its goal of 66 million-ton-miles per day.

Question: What is the estimated program acquisition cost (RDT&E, Procurement, Milcon) and Life Cycle Cost (Operations and Support) for the C-17? Estimated acquisition costs have increased by almost $3 billion since full-scale development began. What accounts for the increase?
Answer:

	(TY$ Million)
R&D	5362
Procurement	31787
Milcon	306
O&S (BY$)	44200

Since the first C-17 SAR was submitted, the C-17 program has a total change in acquisition costs of-$2.3 billion. Changes through December 1987 (-$4.1 billion) are documented in previous SARs. The changes from the December 1987 to December 1988 SAR reflect an increase of $1.8 billion. This increase is split between RDT&E (+$.4 billion), procurement ($+1.2 billion), and Milcon (+$.2 billion). RDT&E increases are for added live fire test requirements and capability enhancements, revised engineering manhours, and reestimate of contract costs. These increases are offset by a decrease in data, PSE, and escalation changes.

Procurement increases include support equipment requirements, added capability enhancements, increase to recurring manufacturing labor costs, and projected higher airframe and avionics costs. This is offset by decreases for multiyear acquisition, engine price reductions, and escalation changes.

Milcon increases reflect a reestimate of construction costs based on updated site surveys and estimating factors.

In the December 31, 1988, preliminary Selected Acquisition Report it shows that the Air Force hopes to reduce procurement costs by about $2.8 billion (TY$).

Question: Specifically, how does the Air Force plan to do this? What is the current status of these cost reduction efforts? What do the results to date indicate about the likelihood of avoiding these costs?

Answer: The Air Force has initiated several efforts to avoid cost growth as stated in the December 1988 SAR. This includes total quality management (TQM) efforts, incremental Should Cost, Could Cost, procurement pooling, and others. TQM is an on-going effort to strive for the highest quality at the lowest possible cost. It involves not only an Air Force commitment but is being paralleled by TQM efforts by DAC. The first incremental Should Cost team will be underway March 15, 1989, with receipt of the FY 90 production Lot III proposal from DAC. This effort will culminate with contract award scheduled for January 1990 pending T-1 assembly completion (event-based contract award). The other cost reduction efforts are in work. The most probable cost avoidance is to be determined but in all likelihood will be on the order of $1 billion.

The December 31, 1988, preliminary Selected Acquisition Report also shows that multiyear procurement could reduce costs by over $900 million (TY$).

Question: What is this estimate based on and how firm is it?

Answer: The multiyear procurement estimate in the Selected Acquisition Report is an Air Force estimate based on experience from other multiyear programs. This estimate was accomplished by applying factors to the airframe, engine, and avionics costs for annual procurement for FY 93-96 with economic order quantity advance funding included in FY 92. The factors for airframe and avionics (9 percent and 5.8 percent, respectively) are based on an analogy to the B-1 multiyear program. The engine factor of 4 percent is based on discussions with Pratt and Whitney. This estimate was accomplished without Douglas Aircraft Company (DAC) input.

Question: When will the C-17 meet the criteria for multiyear procurement authority? When does the program need to receive multiyear procurement authority in order to realize the estimated cost savings? How could the C-17's funding requirements change if multiyear procurement authority was not approved as planned?

Answer: The C-17 program will meet all multiyear criteria by FY 93. Multiyear procurement authority needs to be received with FY 92 appropriations to allow contract award for the economic order quantity advanced buy. Configuration, production rate, and funding need to be stabilized prior to initiation of multiyear procurement. The C-17's overall funding requirements will increase by approximately $900 million for the FY 93-96 procurement if multiyear is delayed or not approved as planned. This reflects the adjustments made for multiyear savings in the December 31, 1988, Selected Acquisition Report.

Question: What is the estimated cost for incorporating defensive systems in the C-17 and how firm are the current estimates?

Answer: The C-17 estimated cost for Defensive Systems is $437 million based upon a preliminary planning configuration (TY$). Douglas Aircraft Company (DAC) is conducting an analyses of viable defensive systems suites and will present a report on the results of this study. After review, the Air Force will select a defensive system suite and DAC will submit a firm-cost proposal in the April 1990 timeframe.

Question: The December 31, 1988, preliminary Selected Acquisition Report also shows reduced costs of about $500 million (TY $) due to changes in economic escalation indices? What are the reasons for changing the indices and how reasonable are they?

Answer: The inflation indices used in the December 31, 1988 Selected Acquisition Report for the C-17 are those directed by the Office of the Secretary of Defense, Comptroller (OSD)(C)). These indices are updated annually and directed by OSD(C) to be used on all weapon system estimates.

The indices are initially determined through a triumvirate of the Council of Economic Advisors, the Treasury Department, and the Office of Management and Budget (OMB). OMB then directs their use to OSD(C) who, in turn, forwards the indices to the military departments.

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